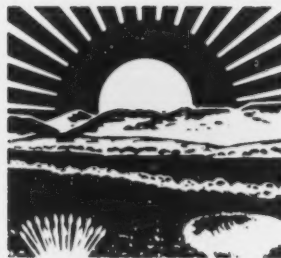


1984
OHIO ENERGY
STATUS REPORT



STATE OF OHIO
Richard F. Celeste, Governor

DEPARTMENT OF DEVELOPMENT
Alfred S. Dietzel, Director

STATE OF OHIO
OHIO DEPARTMENT OF DEVELOPMENT
DIVISION OF ENERGY

In accordance with Section 1551.04(E) of the Ohio Revised Code, the Ohio Division of Energy hereby submits its annual Energy Status Report. For further information, contact the Information and Computer Support office at (614) 466-6517.

Published May 1, 1985

Table of Contents

	Page
I. Overview of Ohio 1983 Energy Consumption. . . .	1
A. Statewide Energy Use and Consumption. . . .	1
B. Residential Sector.	2
C. Commercial Sector	4
D. Industrial Sector	6
E. Transportation Sector	7
F. Electric Utility Sector	8
II. Outlook: Ohio Energy Consumption, 1983-1994 . .	10
III. Overview of Ohio 1983 Energy Production	15
A. Statewide Fuel Production	15
B. Ohio Coal Production.	16
C. Ohio Natural Gas Production	19
D. Self Help Natural Gas	20
E. Distribution Natural Gas.	21
F. Oil Production.	22
IV. Alternative Energy Resources.	23
V. Biomass	24
VI. Notes and Sources	51

List of Tables

<u>General</u>	Page
Table 6: Per Capita Energy Consumption, Ohio and U.S., 1973-1983.	27
Table 7: Ratio of U.S. and Ohio Energy Use to Gross National and Gross State Product, 1973-1983.	28
Table 8: Industrial Energy Use to Gross Product, Ohio and U.S., 1978-1983.	28
 <u>Consumption by End-Use</u>	
Table 1: Ohio Gross Energy Consumption by Sector, 1978-1983	1
Table 2: Sectoral Energy Consumption Shares, Ohio & U.S., 1983	2
Table 4: Gross Energy Consumption, by Fuel, 1978-1983	25
Table 5: Consumption by End-Use and Energy Source, 1983	26
Table 9: Coal Consumption by End-Use Sector, 1978-1983	29
Table 10: Electricity Consumption by End-Use Sector, 1978-1983	30
Table 11: Natural Gas Consumption by End-Use Sector, 1978-1983	31
Table 12: Petroleum Consumption by End-Use Sector, 1978-1983	32
Table 13: Ohio Energy Production & Consumption; All Fuels, 1960-1983	33
Table 14: Coal Development Office Purposes, Programs and Projects	35
Table 15: Ohio Coal Use by Source, 1970-1983.	36

List of Tables (Continued)

<u>Fuel Specific</u>	Page
Table 3: Ohio Interstate Pipeline Suppliers, 1983. . . .	22
Table 16: Inventory of Current Ohio Power Plants. . . .	37
Table 17: Electric Consumption by Industrial SIC Code, 1978-1983	41
Table 18: Natural Gas Consumption by Industrial SIC Code, 1978-1983	41
Table 19: Electricity Sales, Revenues and Customers, by Sector	42
Table 20: Ohio Electric Utility Environmental and Research Expenditures	43
Table 21: Ranking of Ten Major Electric Utilities	44
Table 22: Self Help Natural Gas Sales Volumes, 1978-1983	45
Table 23: Natural Gas Sales, Revenues and Customers by Sector	47
Table 24: Petroleum Consumption by Product and Sector . .	48
Table 25: Ohio Retail Gasoline Market Shares 1982-1983. .	49
Table 26: Gasoline Prices, 1973-1983.	50

List of Figures

<u>Consumption</u>		
<u>Actual</u>		Page
Figure 1:	Ohio Residential Sector Energy Consumption, 1960-1983	3
Figure 2:	Ohio Commercial Sector Energy Consumption, 1960-1983	4
Figure 3:	Ohio Industrial Sector Energy Consumption, 1960-1983	5
Figure 4:	Ohio Transportation Sector Energy Consumption, 1960-1983 Per Capita Energy Consumption 1973-1983	7
Figure 5:	Ohio Electric Utility Energy Consumption, 1960-1983	8
Figure 6:	Ohio Energy Consumption, 1960-1983.	10
Figure 19:	Per Capita Energy Consumption; Million Btu. . .	27
<u>Forecast</u>		
Figure 7:	Projected Ohio Energy Consumption, 1983-1994. .	10
Figure 8:	Projected Ohio Resident Energy Consumption, 1983-1994	12
Figure 9:	Projected Ohio Commercial Energy Consumption, 1983-1994	12
Figure 10:	Projected Ohio Industrial Energy Consumption, 1983-1994	13
Figure 11:	Projected Ohio Transportation Energy Consumption, 1983-1994	14
<u>Fuel</u>		
<u>Coal</u>		
Figure 12:	Production of Coal, 1960-1983	16
Figure 13:	Ohio Electric Utility Receipts of Coal by Producing State, 1983	17

List of Figures (Continued)

	Page
Figure 14: Average Mine Price of Coal by Producing State, 1979-1983	17, 40
Figure 20: Ohio Energy Production, 1960-1983	34
<u>Natural Gas</u>	
Figure 15: Ohio Natural Gas Production, 1976-1983.	19
Figure 16: Ohio Natural Gas Wellhead Price, 1976-1983. . .	19
Figure 17: Estimated Ohio Industrial Gas Consumption by Source, 1978-1983.	20
Figure 22: Historic and Projected Purchases of Ohio Natural Gas by Ohio Distribution Companies, 1981-1993	45
<u>Petroleum</u>	
Figure 18: Ohio Crude Oil Wellhead Price, 1976-1983. . . .	23

OVERVIEW OF OHIO 1983 ENERGY CONSUMPTION

Statewide Energy Use and Consumption

Ohio aggregate energy consumption was 14.7 percent less in 1983 than the previous year. The bulk of this decrease can be attributed to a significant reduction in coal consumption by electric utilities for generation of electricity. Energy required for generation declined 14.1 percent from 1982; this reduced total coal purchases despite an increase in the amount of electricity generated and sold during 1983. Coal use fell 9.3 percent, one of the largest single year reductions in over 10 years.

TABLE 1 OHIO GROSS ENERGY CONSUMPTION BY SECTOR
Trillion Btu

	1978	1979	1980	1981	1982	1983
Residential	669.4	643.1	603.6	590.7	562.2	510.5
% of Total	17.1	16.1	16.3	16.7	17.0	16.3
Commercial	400.4	388.4	370.7	353.1	343.9	342.4
% of Total	10.2	9.7	10.0	10.0	10.3	10.9
Industrial	1306.2	1351.8	1186.8	1171.4	928.7	911.5
% of Total	33.4	33.8	32.1	33.1	28.0	29.0
Transportation	826.3	795.4	743.9	723.7	690.1	690.7
% of Total	21.1	19.9	20.1	20.4	20.8	22.0
Energy for Electricity Generation	708.6	815.9	793.9	709.5	798.7	685.8
% of Total	18.1	20.4	21.4	20.0	24.0	22.2
Total Consumption	3910.9	3994.6	3698.9	3548.4	3323.6	3140.9

Ohio 1983 per capita energy consumption continued to decline. Ohio per capita energy consumption dropped from 310.6 Mbtu in 1982 to 293.5 Mbtu in 1983. This represents an increase in energy efficiency of 5.5 percent. At the national level, 1983 per capita energy consumption remained relatively constant at 312.7 Mbtu. (See Table 4)

Within the primary consuming sectors, residential consumption exhibited the largest decline in total energy used, with a reduction of 9.2 percent from 1982 to 1983. The commercial, industrial, and transportation sectors remained relatively constant in both consumption and their proportion to state aggregate consumption.

TABLE 2 SECTORAL ENERGY CONSUMPTION SHARES

	OHIO		U.S.
	1983	1982	1983
INDUSTRIAL	28.0%	28.0%	27.8%
ELECTRIC UTILITY	21.8%	24.0%	25.0%
TRANSPORTATION	22.0%	20.8%	26.9%
RESIDENTIAL	18.3%	17.0%	
COMMERCIAL	10.9%	10.3%	
TOTAL CONSUMPTION			
TRILLION BTU	3,140.9	3,323.4	70,515.0

NATIONAL DATA NOT DISAGGREGATED FOR RESIDENTIAL AND COMMERCIAL SECTORS

Ohio Residential Sector

Ohio residential consumers continue to increase the efficiency with which they use energy. In 1983, aggregate residential consumption declined 9.2 percent from 1982. Residential energy consumption is defined as private household use of energy predominantly for space heating, water heating, air conditioning and cooking. Since 1978, the average Ohio residential energy consumer reduced total annual energy use by more than 23.8 percent.

The most significant change in residential fuel consumption from 1982 was a 10.5 percent reduction in the amount of natural gas consumed. Natural gas consumption declined from 367.9 Tbtu in 1982 to 329.2 Tbtu in 1983. At an average cost of \$5.00 per thousand cubic feet, Ohio residents saved more than \$185 million on avoided natural gas costs due to this reduction.

OHIO RESIDENTIAL SECTOR ENERGY CONSUMPTION 1960 - 1983

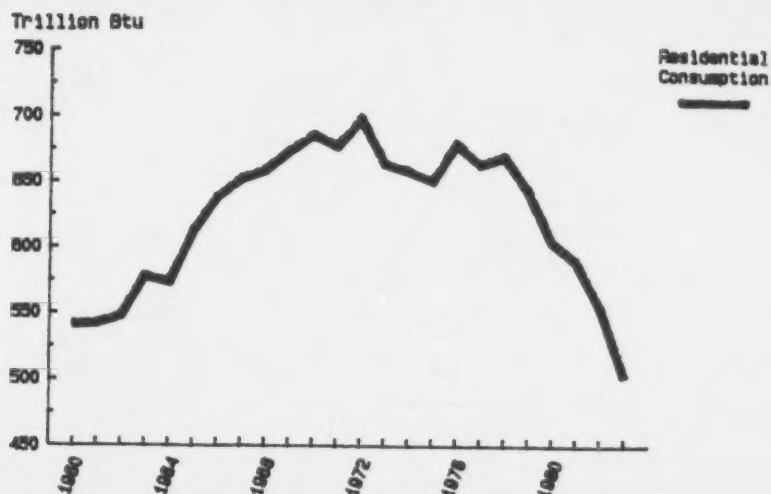


FIGURE 1

Nationally, the composite residential and commercial end-use sector comprised a significantly smaller portion of total energy consumption than in Ohio. This proportional difference in consumption may be attributed to greater space heating requirements for Ohio homes and businesses versus the U.S. average. Heating requirements, measured in weather degree day data, in Ohio were 13 percent higher than U.S. average during 1983.

The large fluctuations in heating requirements caused in previous years by severe weather were not present for the winter of 1982-1983. Degree day data which measure the Tbtu required within one heating season to raise temperatures to 65 degrees fahrenheit, remained comparable for 1982 and 1983. Since there was virtually no change in population for the same period, the reduction in natural gas consumption can be attributed to conservation induced by the large retail price increases which occurred in 1983.

The refined petroleum products used as heating fuels are residuals, distillates and kerosene. These fuels often substitute for natural gas heating. Since residential petroleum consumption declined 10.3 percent from 1982 to 1983, and consumption of electricity remained relatively stable, significant conservation effort was evident in refined petroleum products used in the residential sector during 1983.

Coal, which comprises less than one percent of all residential fuel use, declined 15.6 percent. An actual inventory of small purchases used for wood/coal burning stoves is not available. Though a minor increase in residential coal consumption was noted from 1981 to 1982, the consumption reduction in 1983 would tend to indicate that coal is not becoming a favored alternative to existing heating fuels.

OHIO COMMERCIAL SECTOR ENERGY CONSUMPTION 1960 - 1983

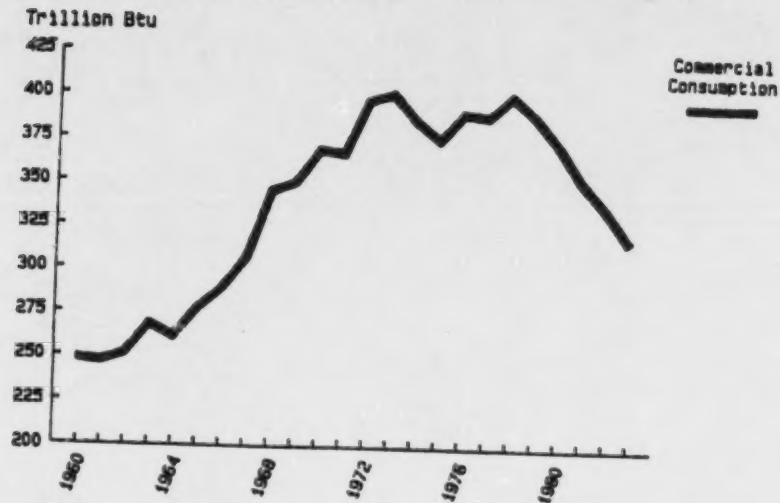


FIGURE 2

Ohio Commercial Sector

Ohio's commercial sector is composed of non-manufacturing business establishments which include motels, restaurants, wholesale businesses, retail stores, and health, social, governmental and educational institutions. Total fuel consumption by the commercial sector declined less than one percent in 1983.

Over the past few years, commercial natural gas consumption has followed the same pattern as that for the residential sector. This was again true in 1983 when commercial natural gas consumption declined 12.6 percent. However, this was offset by a comparable increase in electricity consumption. In 1983, natural gas accounted for approximately 42 percent of total commercial energy consumption.

Commercial consumption of electricity increased an astonishing 12.1 percent from 1982 to 1983. During the previous year, commercial demand for electricity increased 2.0 percent which was more in keeping with the trend of past decades. Electrical space heating additions or conversions alone cannot account for such a significant increase in demand. It is surmised that the increase, which brought commercial demand for electricity to a record level, underscored the technical changes and economic recovery occurring in this sector of Ohio's economy.

Contrary to the trend observed in other sectors, commercial coal consumption increased 78.0 percent; although coal only accounts for less than one percent of total commercial energy consumption. This increase did not substantially impact either

aggregate coal consumption levels or overall commercial sector totals. However, 1983 was the first year since 1974 that commercial coal consumption exceeded 10 Tbtu.

Commercial energy use, particularly electricity consumption, is highly dependent on the vitality of Ohio's overall economy. The amount of energy consumed by retail stores, motels, restaurants, etc., depends directly upon residential consumers, their disposable incomes, geographical wage levels, plus indirectly significant factors such as transportation and commodity costs.

During 1983, total Ohio wage and salary disbursements increased approximately 12.0 percent. Personal income measured in constant dollars increased 10 percent while consumer price increases remained well below the national increase. Transportation fuel prices declined. Food and entertainment prices rose only five percent, indicating that service sector prices were relatively lower than during the previous year. Consumer behavior and spending attitudes play a large part in determining the energy consumption trends within the commercial sector. Preliminary data from 1984 indicates that electricity demand growth continues to increase at more than 7.5 percent over the 1983 level. (For additional information contact the Ohio Department of Development, Ohio Data Users Center, Ohio Economic Indicators Quarterly)

OHIO INDUSTRIAL SECTOR ENERGY CONSUMPTION 1960 - 1983

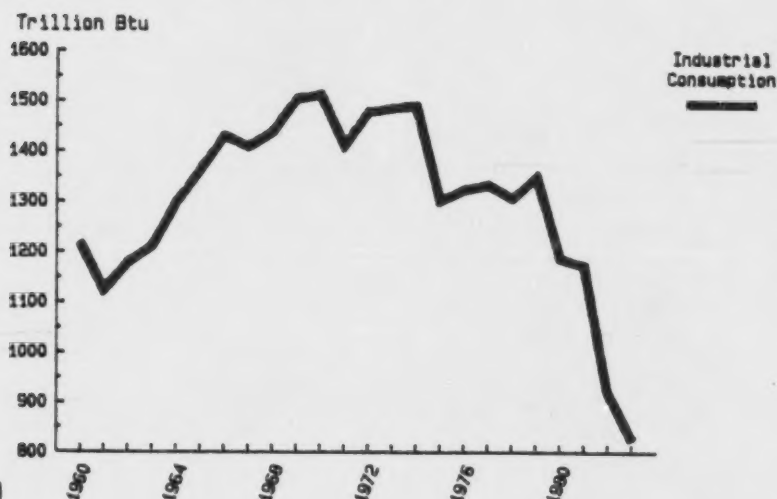


FIGURE 3

Ohio Industrial Consumption

Historically, the industrial sector has been highly energy intensive, relative to the nation. During 1983, as in 1982, Ohio industrial consumption was the lowest per dollar of State product in over two decades. This level now rivals the U.S. proportion of energy consumed within the industrial sector to the gross national product. (See Table 6)

Industrial consumption declined 1.8 percent from 1982, designating 1983 as the lowest level industrial energy consumption in over 25 years. Especially during the past two years, a significant change in Ohio's industrial sector energy consumption patterns has become evident, characterized by a reduction in purchases of utility natural gas and of coal.

In 1983, self help gas, which is Ohio gas directly purchased by an industrial customer, usurped 56 Tbtu of traditionally supplied utility natural gas. (This represents 22 percent of total industrial natural gas consumption.) In addition to self help competition, industrial firms have also sought new means of acquiring energy in an attempt to lower fuel costs. One particular large industrial concern, believed to be one of the largest natural gas consumers in the world, established its own direct purchases from an interstate wholesaler of natural gas with the construction of its own private transportation pipeline.

Due to the economic recession, many firms have drastically reduced or eliminated their demand for natural gas and other energy sources. The Columbia Gas of Ohio and the Cincinnati Gas and Electric Utility Service areas, serving central and southern Ohio respectively, were among the hardest hit relative to their market size. In the northern portion of the State, coal consumption was more severely reduced by market fluctuation. Most notable were the substitution of electric arc furnaces for existing coal fired boilers.

Industrial consumption of utility supplied electricity increased 37.3 Tbtu from 1982 to 1983. This represents a 24.6 percent jump in the demand for electricity. A continuation of this trend during the 1984 demand year would result in equal market shares, as measured in Tbtu, for natural gas and electricity. A similar market allocation existed in 1977. (See Tables 15 & 20)

However, the nature of the industrial market has changed dramatically over the past several years. Spurred by the recession and advances in technology, Ohio's industrial base is in the process of shifting from a predominantly heavy metalurgical and fabricating center to a less fuel intensive structure expanding in areas such as robotics and communication equipment manufacturing.

Self help natural gas purchases and similar non-traditional fuel procurement practices will continue to play a significant role in determining the energy consumption mix for Ohio's industrial sector. (See Natural Gas Production, Self Help)

1983 was marked by closer industrial consumer price parity between utility supplied natural and refined petroleum products. Price parity is significant, because petroleum and natural gas are alternatively used in multi-fuel boilers in response to price savings. Petroleum fuel use for 1983 comprised approximately 24 percent of total industrial fuel consumption. Petroleum has steadily increased from supplying 14 percent of aggregate industrial energy in 1973 to its present level. However, industrial petroleum consumption declined only slightly, 3.0 percent from 1982 to 1983.

OHIO TRANSPORTATION SECTOR ENERGY CONSUMPTION 1960 - 1983

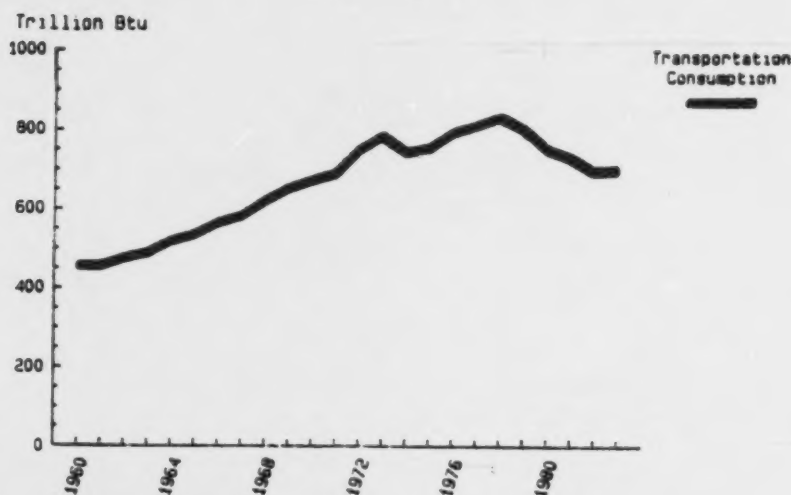


FIGURE 4

Ohio Transportation Sector

Ohio's transportation sector energy consumption has remained relatively unchanged from 1982 to 1983. Historically it appears to be the first lull in consumption decline since the 1978 oil price increase. In 1983, total transport consumption was 690.1 Tbtu; 99.9 percent of this was designated as petroleum motor fuels. In previous years, coal and electricity constituted a large sector of transport fuels. Both natural gas and electricity are still predominantly used for pipeline movement of natural gas. These patterns have remained virtually unchanged over the past decade. (See Table 22)

Wholesale and retail prices of crude petroleum and gasoline decreased in 1983. Overall nominal prices for retail gasoline have fallen near or below 1980 levels. The relationship between

price and consumption of motor fuels is clearly observed following the 1973 and 1979 price hikes. Whether the 1982 and 1983 levels present a point of departure, indicating a resurgence in consumption levels or price elasticities, is not clearly discernible at this time. Retail prices of gasoline declined by an approximate five percent from 1982 and 1983, while aggregate petroleum consumption increased less than one percent.

The estimated number of miles traveled annually per household at both the national and Ohio level continue to increase. The average number of miles traveled per household in Ohio has increased more than 20 percent over the past decade, while aggregate gasoline consumption remains at pre-embargo levels. This indicates a more efficient use of Ohio's petroleum motor fuels.

Measured on a per capita basis, Ohio consumption was 64.6 MMBtu per capita. This is nearly 23 percent less than the U.S. average of 83.7 MMBtu per capita for 1983. In dollar value, Ohioans expended over 21 percent less in 1983 on transportation fuels than five years previously.

OHIO ELECTRIC UTILITY ENERGY CONSUMPTION 1960 - 1983

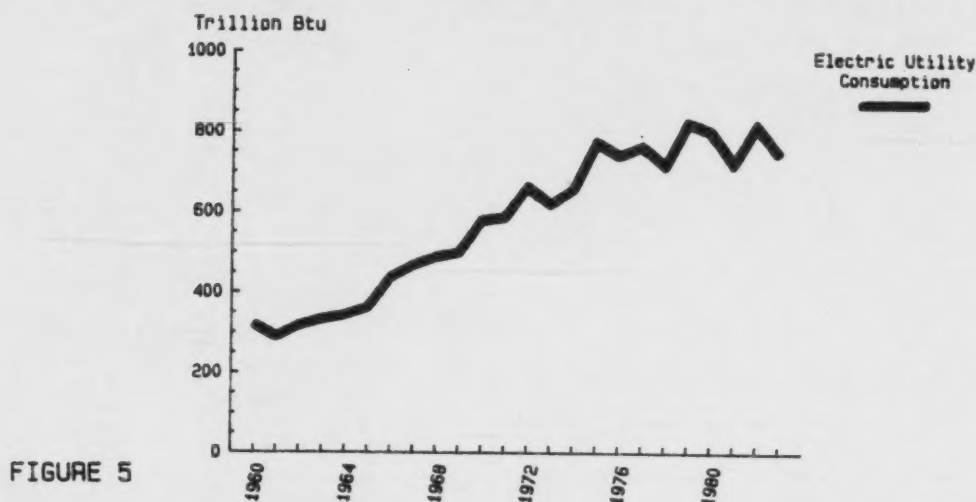


FIGURE 5

Ohio Electric Utility Sector

The electric utility sector is composed of publicly and privately owned companies that generate electricity primarily for resale. Over 95 percent of Ohio's electricity in 1983 was generated from coal. This is down from the previous year's 97 percent. Both in Ohio and nationally, utility coal consumption declined from 1443.3 Tbtu in 1982 to 1042.1 Tbtu in 1983. However, 1983 was an important year in that Ohio utilities purchased a larger portion of their coal supplies from Ohio coal producers. (See Production, Coal)

Total electricity generation as reported by the eight major Ohio utilities, increased 8.5 percent from 1982 to 1983. Total end-use consumption of electricity increased by 12.3 percent; while average resale price per megawatt-hour, across sectors and state, declined 3.1 percent.

The net amount of energy required for generation declined 2.2 percent. Nuclear generation of electricity increased. In 1983 Toledo Edison's Davis Besse nuclear plant supplied 9.4 percent of Ohio's electricity, a 200 percent increase over the 3.1 percent in 1982.

Ohio historically has had a higher efficiency ratio for input and output energies. Petroleum consumption declined from 8.9 Tbtu to 1.7 Tbtu, 1982 to 1983. Petroleum is generally used for peaking plants and quick start generator units. A reduction in the amount of petroleum consumed suggests a reduction of peaking plant use and quick starting, both indicators of more efficient and stable generation. Natural gas consumption for similar purposes declined from 2.1 Tbtu in 1982 to nearly zero in 1983. The change in fuel mix is the major factor in the reduction of energy required for generation. In 1983, coal was still the predominant fuel source for generation, but the reduction in petroleum and natural gas, coupled with the increase in nuclear generation, resulted in less Tbtu of energy input for greater net generation of electricity.

For a company by company comparison of cost, generation and prices, the Summary of Electrical Statistics is available from the Division of Energy.

OHIO ENERGY CONSUMPTION 1960 - 1983

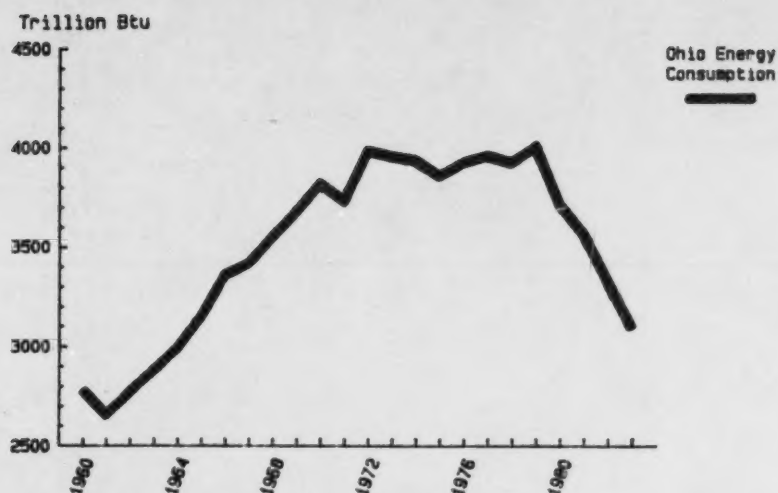


FIGURE 6

OUTLOOK: Ohio Energy Consumption, 1983-1994

Ohio in aggregate energy consumption patterns have been closely associated with trends in Gross State Product (GSP), inflation, and fuel prices. Between the years 1962 and 1970, these factors increased along with consumption in a relative and stable manner. During this period, fuel prices remained nominally stable.

PROJECTED OHIO ENERGY CONSUMPTION 1983 - 1994

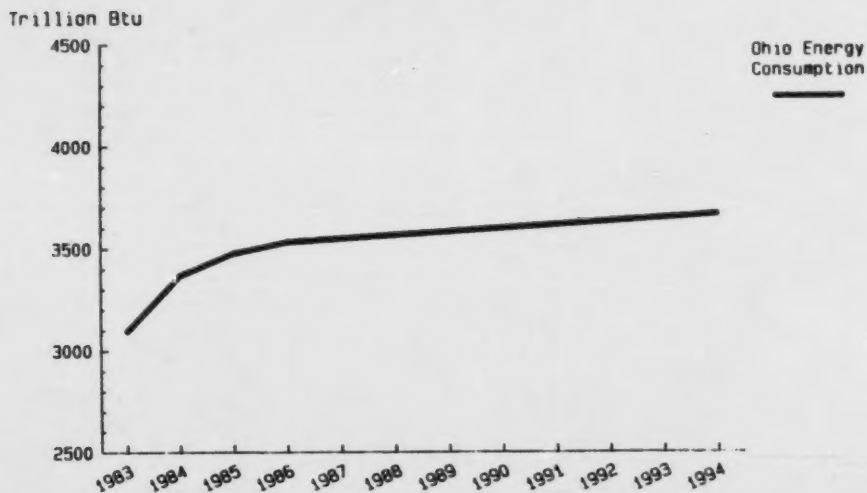


FIGURE 7

The international economic shocks experienced in the 1970's altered the traditional relationship between consumption and reduction. In Ohio specifically, there has been a significant effort exerted by both the public and private sectors to retain established levels of economic production and simultaneously reduce aggregate energy costs through decreased consumption. The need to reduce the dependence on foreign energy sources, namely petroleum, runs tandem here in Ohio with the desire to depend more directly on Ohio energy resources.

The economic recession of the past decade has severely affected both Ohio and the Midwest. This is most significantly illustrated by a decline in energy consumption and production within the industrial sector and the slow establishment of new businesses and/or expansion of industrial capacity.

The ten year forecasts of sectoral energy and fuel requirements presented in this report are based upon the following assumptions:

- 1) The post-1979 OPEC recession reached its lower threshold in 1983.
- 2) Economic recovery will continue through 1986, resulting in lower Ohio unemployment rates.
- 3) Over the next few years, real GSP will gradually increase to 1979 levels.
- 4) Real prices of energy for all sectors will remain stable or approximate their 1983-84 levels.

Implicit in assumptions 2) and 4) is the tenet that no severe recessions will occur between 1984 and 1994. Further, the decline in the growth rate of inflation observed in 1982 and 1983 will continue through 1994, despite the current size of the federal deficit.

To what extent the assumptions outlined above are actually realized, depends largely upon the specific fiscal and monetary measures adopted by the federal government in dealing with the problems of the budget deficit, unemployment, and inflation. Since the nature, timing and the net impact of such measures are quite impossible to determine ahead of time, ODOE forecasting models are developed with flexibility to continuously monitor, identify and evaluate emerging macro-economic trends and their net impact upon energy and fuel requirements in Ohio. The model is assumed to have a variance of three percent above or below the levels of sectoral energy and fuel requirements presented in this volume. More detailed analysis of fuel consumption, and supply and demand in the short run are presented in the Short Term Report, available from the Division of Energy.

PROJECTED OHIO RESIDENTIAL ENERGY CONSUMPTION 1983 - 1994

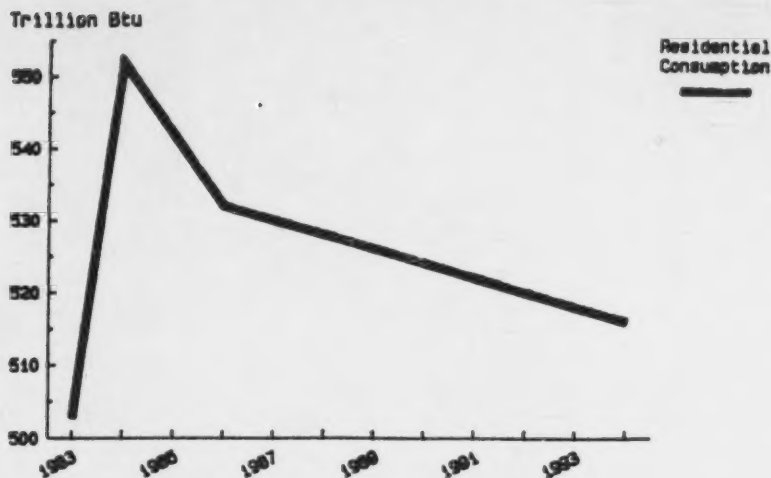


FIGURE 8

The graph of residential consumption for 1983 marks the lowest level of energy consumption since 1960. Demand is forecast to increase to 1963 levels by 1985, after which time it will remain fairly stable through 1994.

PROJECTED OHIO COMMERCIAL ENERGY CONSUMPTION 1983 - 1994

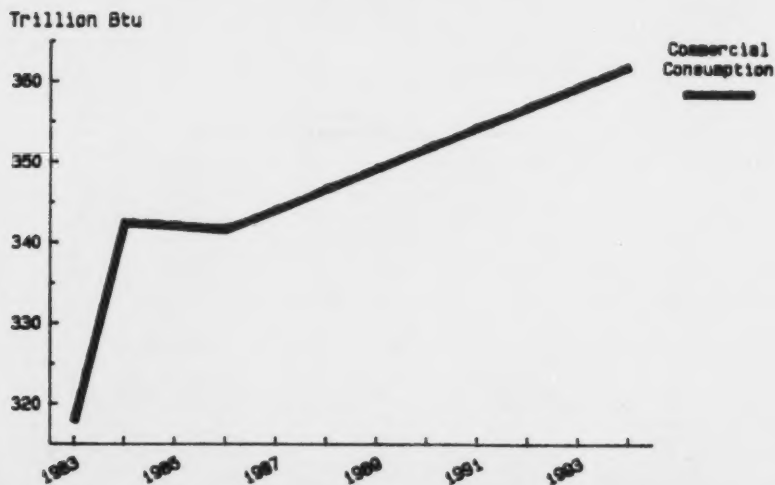


FIGURE 9

Commercial energy consumption has declined since the 1979 recession, and parallels late 1960's levels. Energy demand in the sector is forecast to increase over the next two years. ODOE forecasts a continued increase in commercial demand from 1986 through 1994.

PROJECTED INDUSTRIAL ENERGY CONSUMPTION 1983 - 1994

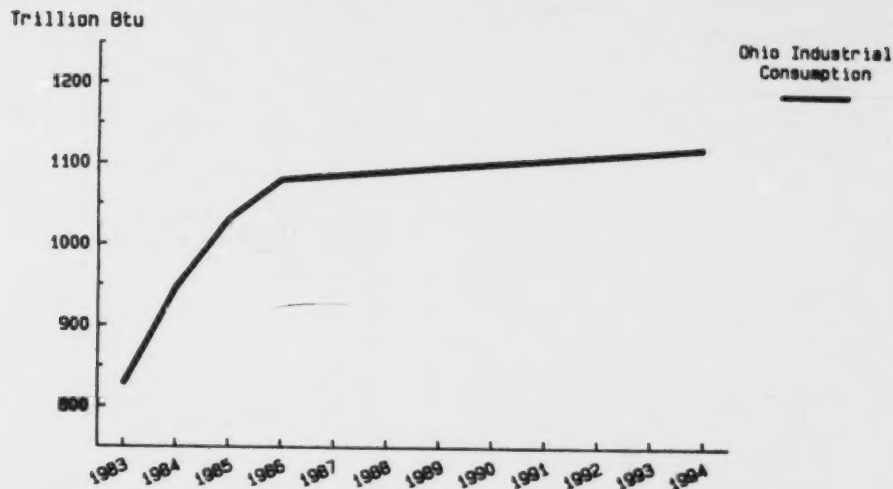


FIGURE 10

The graph of industrial energy consumption presented includes only fuel purchased directly from utilities. In other words, self help natural gas, which represents an additional 38 Tbtu in 1982 and 56 Tbtu in 1983, is not included in total consumption.

Even with self help gas included, industrial energy consumption for 1983 and 1982 are the lowest recorded levels in over two decades. ODOE forecasts an increase in energy consumption corresponding to the anticipated economic recovery. Assuming a three percent variance in the forecast demand, it will be six or more years before industrial consumption levels will approach the 1979 level.

PROJECTED TRANSPORTATION ENERGY CONSUMPTION 1983 - 1994

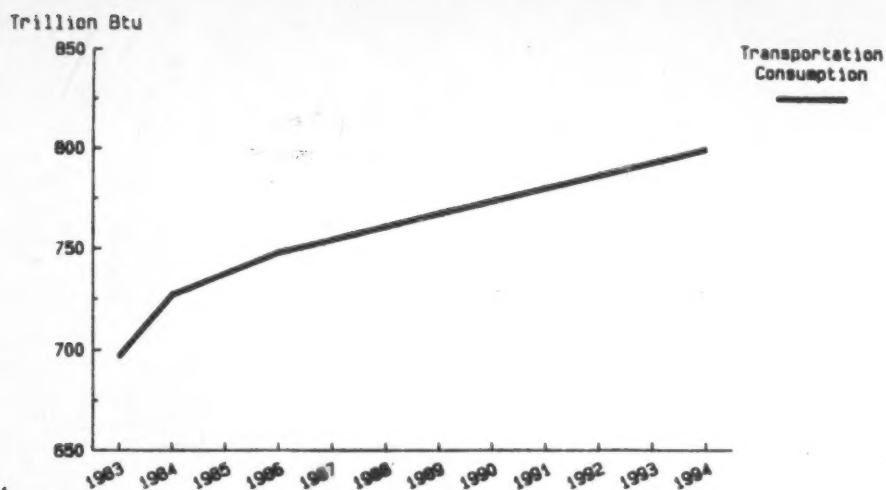


FIGURE 11

A progressive increase in transportation fuel demand is expected over the next decade. The 1984 level of demand, given a continued increase in vehicle miles traveled, should remain below 1978 peak consumption.

Overall, ODOE forecasts a gradual increase in the total annual energy consumption for Ohio, but a continuing decrease in energy use per dollar of GSP. The projected 1994 level of consumption is forecast to be 85 to 90 percent of the late 70's peak levels. This projection of consumption coupled with a relatively constant population and resurgence of Gross State Product underscores the assumption that Ohio is becoming more energy efficient.

OVERVIEW OF OHIO 1983 ENERGY PRODUCTION

Statewide Fuel Production

Ohio's indigenous energy resources - coal, natural gas and crude oil could potentially supply the equivalent of one-half of the state's total energy demand. Increased reliance upon the state's own resources reduces Ohio's vulnerability to external supply or price disruptions. This limits the amounts paid for transportation of fuels, supports reinvestment in our own Ohio industries and creates Ohio jobs, keeping energy dollars within the state for support of local economies.

In 1983, Ohio fuels provided the equivalent of 33.4 percent of total state energy demand, slightly less than the 34.9 percent in 1982. Despite increases in both natural gas and crude oil production, a 5.7 million ton drop in Ohio coal production accounts for the aggregate decline. Alternative and renewable energy sources provided less than 0.1 percent. Altogether, in 1983, Ohio produced fuels were valued at \$2.0 billion and accounted for about 20,000 Ohio jobs.

Historically, Ohio fuels have provided the equivalent of 30 to 40 percent of total energy consumption. Several factors combine to keep this contribution below the theoretical maximum:

- . Environmental quality concerns keep Ohio's high sulfur coal from providing 100 percent of the state's demand. In 1983, Ohio produced coal accounted for only about 59 percent of total use.
- . A lack of available transmission services are keeping natural gas deliveries from Ohio wells to industrial concerns at three to five percent less than possible.
- . Ohio crude oil is more suitable for refining into lubricants instead of gasoline and is somewhat constrained by limits on natural gas transmission, since both are often produced from the same wells.
- . Alternative, renewable, and consumer controlled Ohio energy sources are only beginning to contribute significantly to the State's overall energy supply.

Ohio Coal Production

Ohio is both a major coal consuming and producing state. In 1983, Ohioans used 56.4 million tons of coal, while producing 33.2 million tons. Ohio coal production was the equivalent of 59 percent of consumption in 1983. The value of this Ohio coal at the minemouth was approximately \$1.1 billion. Coal production is a vital component of Ohio's economy; the Ohio coal industry has nearly 9,500 employees in 24 Ohio counties. (See Figure 16)

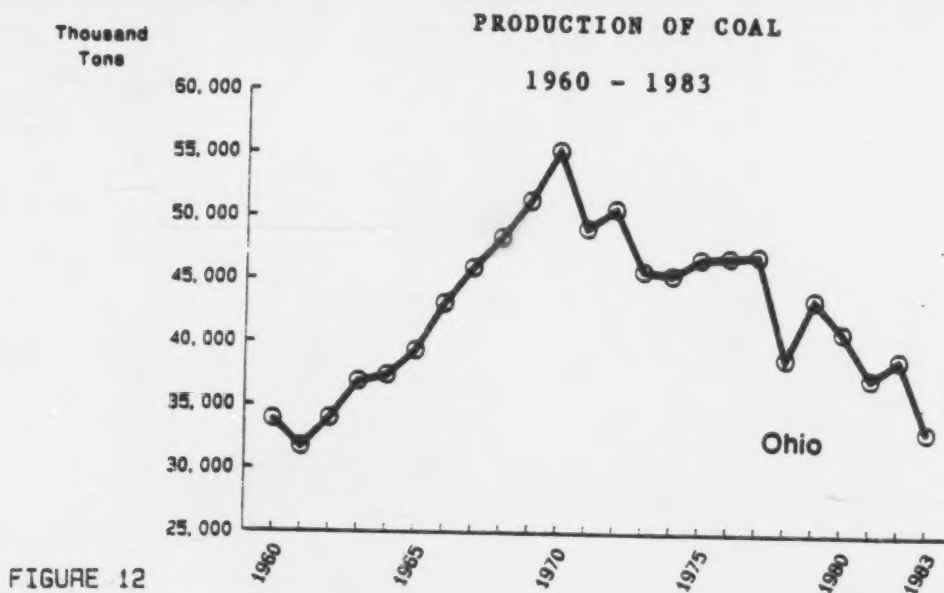


FIGURE 12

Productivity from Ohio coal mines is now increasing after several years of decline. In 1980, 162 miners were required to produce one million tons of coal from a surface mine and 380 miners per one million tons from underground. In 1983, these production rates were 149 and 284 respectively. Continued increases in productivity and the associated lowering of production costs will enhance the competitive minemouth price of Ohio coal.

Nevertheless, Ohio coal production reached its lowest point in 20 years during 1983. From peak production in 1970 of 55.1 million tons, Ohio coal production has eroded steadily to its present level. Ohio coal has lost nearly one-fourth of its out-of-state market since 1977 as a result of its high sulfur content. When in-state sales reductions are included, 80 percent of the overall decline in Ohio coal markets can be attributed to the electric utility sector.

OHIO ELECTRIC UTILITY RECEIPTS OF COAL BY PRODUCING STATE 1983

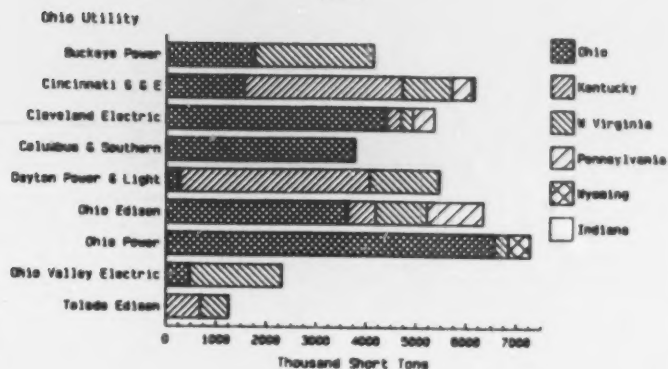


FIGURE 13

Most Ohio coal is used in Ohio and for electricity generation. Several Ohio utilities are primarily dependent upon Ohio coal, including Columbus and Southern Ohio Electric Company which burns 100 percent of Ohio coal. On the positive side, the proportion of coal consumed by Ohio utilities which was produced in Ohio, increased from 48 to 53 percent in 1983. Therefore, despite the decline in production, Ohio coal provided a somewhat greater share of the state's total 1983 consumption. (See Table 14)

However, Ohio continues to be a net importer of coal. A general lack of cost effective commercial scale sulfur removal technologies, capable of cleaning high sulfur Ohio coals to an environmentally acceptable level, has resulted in a growing dependence upon lower sulfur coal supplies imported principally from West Virginia and Eastern Kentucky. Toledo Edison, for example, is completely dependent upon such out-of-state low sulfur coals. Western low sulfur coal deliveries, which reached their peak of 4.8 million tons in 1977, ceased altogether in late 1983.

Average Mine Price of Coal by Producing State 1979 - 1983

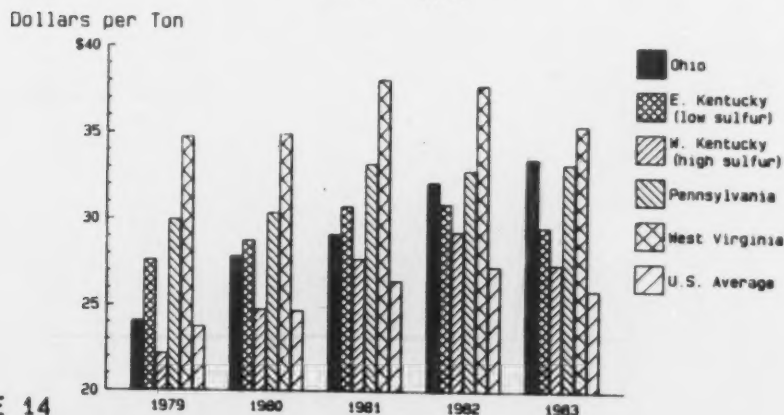


FIGURE 14

The reestablishment of Ohio coal's markets is entirely dependent upon the development and cost effectively commercial availability of technologies which will efficiently and economically reduce sulfur oxide emissions. Such technologies include, but are not limited to, pre-combustion removal of sulfur from the raw coal, removal of sulfur during combustion, and removal of sulfur oxides from flue gasses. Technology advancements will significantly determine the upper and lower bounds of Ohio coal markets in the late 1980's and the 1990's.

Recognizing the appropriate role for State Government in this development process, the Ohio Coal Development Office has been established within the Department of Development, Division of Energy to promote the commercialization of clean Ohio coal use technologies. The Coal Development Office works jointly with public-private partnerships to bring available technologies to full scale demonstration. In the past year, the Coal Development Office has co-sponsored eight Ohio coal projects with private sector and electric utility participants. The purposes and the current programs of the Coal Development Office are summarized in Table 13. More complete information regarding the Office's objectives and activities are listed in the Ohio Coal Development Agenda, available from the Division of Energy.

Public and private ventures are underway. Ohio utilities themselves have invested billions of dollars to date for environmental quality control (See Table 18). The Ohio Air Quality and Water Development Authorities, the Ohio Environmental Protection Agency, coal miners, producers, users, and environmental equipment manufacturers are each participants in sulfur removal projects.

These vigorous public-private coal market development efforts are designed to reverse the recent downward trends in Ohio coal production and sales. Ohio's coal interests recently joined to retain the 1.5 million tons of Ohio coal sales per year to a Consumer Power generation station in Michigan. This reprieve will permit sales to continue as clean coal technologies are brought into commercial availability.

The future of Ohio coal looks somewhat better than it has for some time. Planning is already underway to assure consideration of Ohio coal for State facilities slated for boiler replacement or renovation. Potential conversion and operation of the Zimmer Power Plant on Ohio coal will expand future demand by nearly 3.5 million tons annually. Already, preliminary data for 1984 show a significant increase in Ohio coal purchases over 1983. Concerted efforts by the State of Ohio coal interests should result in a continuation of this trend.

OHIO NATURAL GAS WELLHEAD PRICE 1976 - 1983

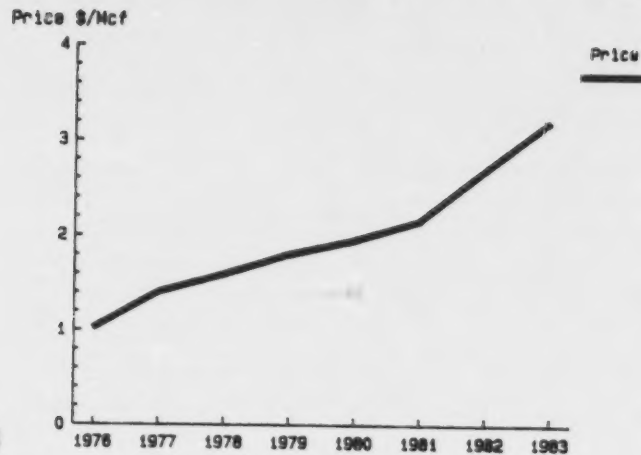


FIGURE 15

Ohio Natural Gas Production

Ohioans consumed 11 percent less natural gas in 1983 than in the previous year. Nevertheless, total production of natural gas from Ohio's reserves rose significantly for the sixth consecutive year. In-state production of 151.3 billion cubic feet (Bcf) was the equivalent of 21.5 percent of total Ohio gas consumption. This gas had a wellhead value of nearly \$500 million.

OHIO NATURAL GAS PRODUCTION 1976 - 1983



FIGURE 16

In 1979, the quantity of Ohio gas produced was the equivalent of 13.0 percent of our total consumption as compared to the 21.5 percent in 1983. While it is generally agreed that Ohio-produced gas cannot provide much more than 25 percent of total State

demand, the data shows that we are rapidly approaching this optimum. The combination of reduced demand and increased Ohio gas production over the past five years, has made Ohio gas consumers significantly less vulnerable to supply or price disruption.

Production and distribution of Ohio's natural gas have been profoundly influenced by three recent and significant changes in the gas market:

- 1) Rising utility gas prices reached, and often exceeded, the delivered price of fuel oil products which could be used by industrial customers in lieu of gas;
- 2) Industrial customers, seeking lower gas prices, began to take advantage of the self help gas program to avail themselves of cheaper gas at the wellhead; and
- 3) Reduced demand, triggered by the recession and higher gas prices, led to a temporary glut of interstate natural gas supplies, forcing changes in gas procurement practices.

Of somewhat less importance, is the January, 1985 decontrol of many federally regulated wellhead gas prices. In anticipation of and concern for the effects of this deregulation, some minor changes in normal gas market operations has occurred.

Self Help Gas

Ohio's natural gas markets changed significantly with an astronomical rise in the volumes of self help gas consumed in the industrial sector. The State's self help program began in 1974 as a means for industrial gas consumers to avoid gas supply

ESTIMATED OHIO INDUSTRIAL GAS CONSUMPTION
BY SOURCE, 1974 - 1983.

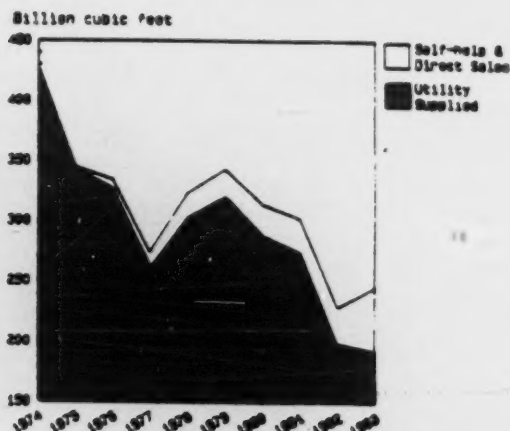


FIGURE 17

curtailments. Industrial concerns can purchase their own gas at the wellhead and have it transported by a gas distribution company directly to their specified location. The program was used extensively during the severest curtailment period of the late 1970s.

As utility natural gas prices continued to rise, Ohio industries began to see directly purchased self help gas as an opportunity for lower priced supplies than their gas utility. Table 21 shows 1983 self help volumes in the East Ohio Gas (EOG) and Columbus Gas of Ohio (COH) service areas. In fact, total self help deliveries would have been even greater had not a lack of pipeline transmission capability been a constraining factor.

The availability of self help gas in Ohio has emerged as a vital resource in the economic development of the State. Self help volumes, being a less expensive source of natural gas supply, improve the competitive position of participating industries. Ohio gas companies, and their customers, receive the benefits of transportation charges, set by the PUCO, which cover the costs of transmission service. Self help demand provides an additional market for Ohio gas producers and adds competition to both the wellhead and the burner tip prices.

In 1984, self help deliveries are being constrained again by physical transmission capability. Nevertheless, it will improve to be a substantial market segment, as most distribution companies are predicting a slight increase in total deliveries. When added to industrial consumer volumes delivered by utilities under Fuel Oil Displacement or Special Marketing Programs, standard distribution company tariff sales will comprise only 60 to 70 percent of all industrial consumption over the next few years. By contrast, in 1974 the standard tariff sales comprised virtually 100 percent of all sales.

Ohio Gas Distribution Company Supplies

Most Ohio gas consumers are served by one of eight major gas distribution utilities. The State also has 21 smaller gas utilities and six municipal gas systems. In 1983, approximately 78 percent of the gas resold by these companies was purchased from an interstate gas pipeline. Table 3 shows the relative percentage purchases from each of these interstates.

Ohio distribution companies purchased approximately 8.5 percent of their supplies from Ohio producers in 1983. This represents a 24 percent increase in direct Ohio gas purchases from the previous year.

Synthetic natural gas (SNG), produced by Columbia LNG Corporation at Green Springs, Ohio, has been a source of supply for several Ohio distribution companies since the mid 1970s, principally Cincinnati Gas & Electric, Columbia Gas of Ohio, Dayton Power & Light, and West Ohio Gas. Historically, SNG has accounted for less than four percent of total state gas supply. In 1983, it was about five percent.

Natural gas supply prices, which have shown extreme upward volatility over the past three years, now appear to be moderating. Estimates provided DOE by Ohio distribution companies in early 1984, pegged the average price of their purchased gas at about \$4.50 per thousand cubic feet (mcf). Some interstate pipelines have announced or implemented price reductions however, and current aggregate prices are likely to be somewhat lower. Prices for Ohio produced gas are consistently reported to be less than those for interstate pipeline supplies. In total, the state's 1983 purchased gas costs are estimated to have exceeded \$3 billion.

TABLE 3 OHIO INTERSTATE PIPELINE SUPPLIERS
1983

PIPELINE	PERCENT OF TOTAL SUPPLY
COLUMBIA GAS TRANSMISSION	42.0
CONSOLIDATED GAS	23.8
PANHANDLE EASTERN	7.6
LAWRENCEBURG	2.0
ALL OTHERS	1.3

Additional information on specific Ohio distribution company supply sources is available in DOE's publication, Summary of Natural Gas Statistics.

Ohio Oil Production

Ohio crude oil production rose to a record 14.97 million barrels in 1983, an increase of 2.7 percent over the previous year. This Pennsylvania Grade Crude is primarily refined into lubricating oils.

Oil and gas are often produced from the same combination wells in Ohio. About six out of every ten wells drilled in 1983 were combination wells. In all, a record 6,260 drilling operations were reported to the Ohio Department of Natural Resources during 1983. Of these over 93 percent were productive wells.

OHIO CRUDE OIL WELLHEAD PRICE 1976 - 1983



FIGURE 18

The 1983 crude oil market was characterized by moderating prices. The significant price increase of recent years was reversed as oil production exceeded demand, and the conservation dampened demand. This decrease in the real price of oil in the world market affected prices at Ohio wellheads as well. The average price per barrel in 1983 was \$28.15, a nine percent decrease from the previous year. Ohio prices generally move in tandem with world prices.

Alternative Energy Resources

The use of Ohio's renewable energy fuels; solar, wind, hydrothermal, wood, alcohol, and other agricultural products, composed an estimated 65 trillion BTU of available energy. This can be equated to two percent of the energy consumed during 1983. Despite the significant increase in consumption since 1972, Ohio's renewable energy industry has been particularly depressed by recent economic recessions.

The number of passive solar installations declined in 1982, recovering in 1983 along with the housing industry. Retrofitting and add-on spaces are the continuing trend as homeowners improve rather than replace current housing stock. Though tax credits for solar installations still exist a 1982 Internal Revenue Service ruling abolished federal credits for hydrothermal or

ground water heating systems. Subsequently, a recovery of \$7 million in claimed tax credits, plus penalties and interest from Ohioans, has depressed sales and installation of hydro and geothermal systems.

Photovoltaics and wind energy projects have also been significantly effected by the recession in the economy as have the amount of monies available for research in alternative energy resources.

Biomass

Ohio's industrial tax credit has encouraged the utilization of waste heat recovery and cogeneration. Eight major industrial firms in Ohio use biomass energy resources directly. Of these, Mead Paper and Stone Container Corporation have installed wood boilers to provide supplemental or primary power for their systems.

In 1983, the U.S. Department of Energy established a biomass energy program. Ohio joined with other states in the Council of Great Lakes Governors to establish a program more suitable for the midwest. Ohio has plentiful agricultural and forestry resources which can be burned directly or converted into alcohol, methane, or other derived energy products. Consequently, in 1983 the Ohio Division of Energy initiated an in-depth resources assessment of Ohio's biomass. The technique employed, included computer analysis of satellite generated data, and ground verification which characterized and quantified the extent of wood and agricultural resources of the state.

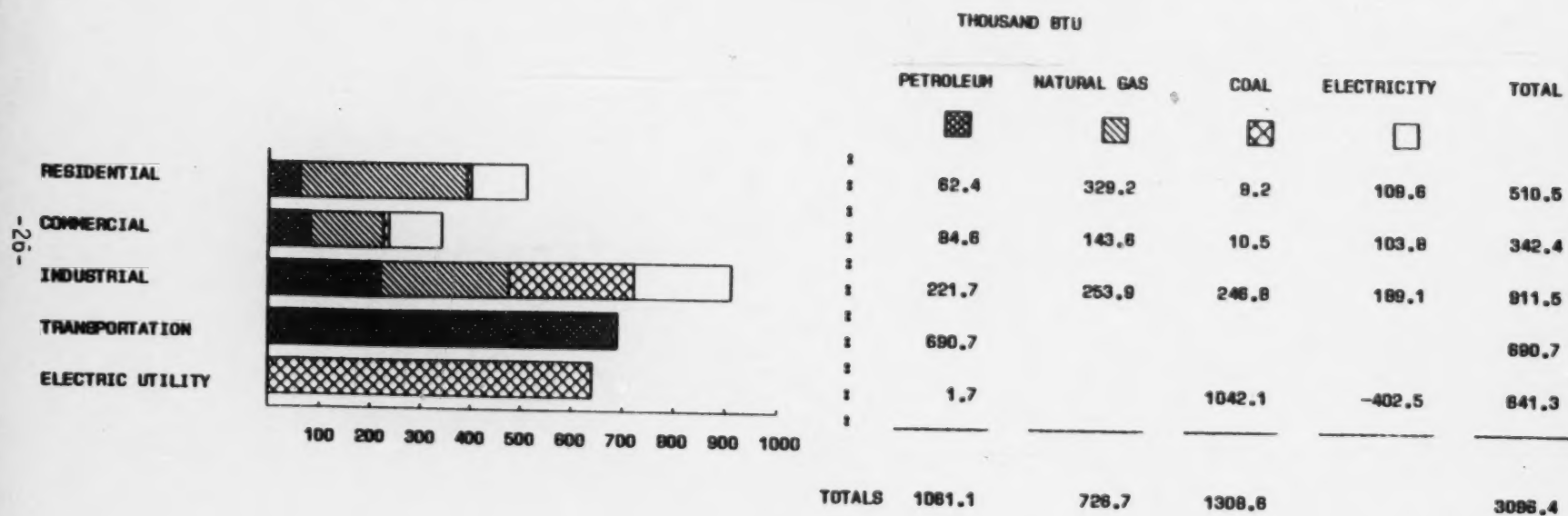
This Ohio program was instrumental in establishing the biomass supply available for a proposed 10 million gallon wood-to-ethanol conversion plant in Southeastern Ohio. The Division maintains area maps which delineated the average tons per acre, the type, density, and biomass/alcohol conversion factors to estimate supply.

Aggregate alcohol production increased in 1983 as the 60 million gallon Ashland owned South Point Ethanol plant operated its first full year. The proposed 10 million gallon wood-to-ethanol conversion project continues with groundbreaking expected in 1985, and full production in 1986. However, major alcohol production remains a slow growth industry partly due to the large capital investment requirements.

TABLE 4 GROSS ENERGY CONSUMPTION BY FUEL
(TRILLION BTU)
1978 - 1983

	1978	1979	1980	1981	1982	1983
COAL						
MILLION SHORT TONS	68.0	72.8	67.3	64.1	62.2	56.4
TRILLION BTU	1543.4	1677.2	1576.2	1501.7	1443.3	1308.6
% OF TOTAL	39.5%	42.0%	42.6%	42.3%	43.4%	42.3%
PETROLEUM						
MILLION BARRELS	260.3	231.7	213.7	201.9	195.2	190.4
TRILLION BTU	1384.8	1322.7	1195.2	1135.2	1072.8	1061.1
% OF TOTAL	35.4%	33.1%	32.3%	32.0%	32.3%	34.3%
NATURAL GAS						
BILLION Cu. Ft.	930.3	936.2	880.2	844.8	754.3	704.2
TRILLION BTU	960.1	966.2	908.4	871.8	778.4	726.7
% OF TOTAL	24.5%	24.2%	24.6%	24.6%	23.4%	23.5%
NUCLEAR & HYDRO						
BILLION KWh	2.4	3.2	2.1	4.4	3.2	4.9
TRILLION BTU	22.6	28.5	19.1	39.7	29.1	44.5
% OF TOTAL	0.6%	0.7%	0.5%	1.1%	0.9%	1.4%
TOTAL GROSS ENERGY CONSUMPTION (TRILLION BTU)	3910.9	3994.6	3698.9	3548.4	3323.6	3140.9

TABLE 5

CONSUMPTION BY END-USE SECTOR AND ENERGY SOURCE
(THOUSAND BTU)

PER CAPITA ENERGY CONSUMPTION MILLION BTU

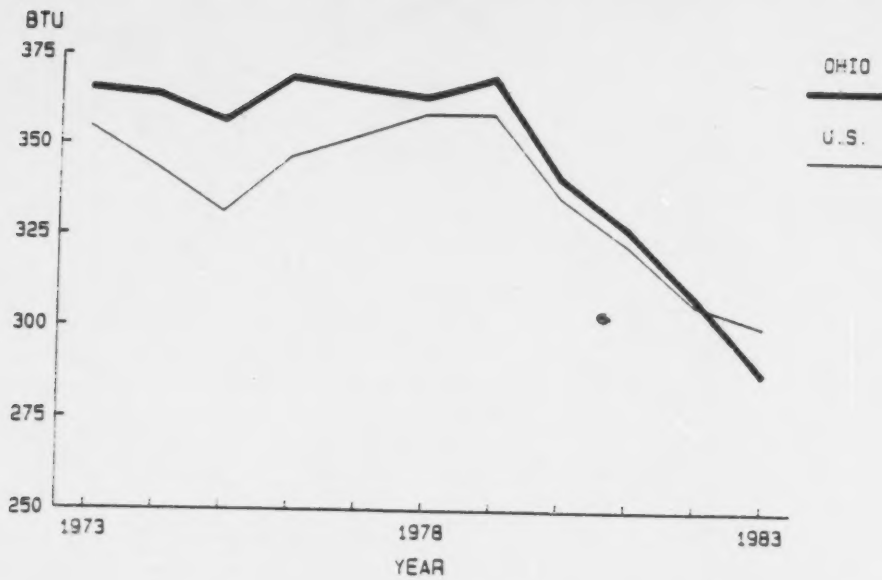


FIGURE 19

TABLE 6 ENERGY CONSUMPTION PER CAPITA
MILLION BTU

	OHIO	U.S.
1973	365.5	354.6
1974	363.6	343.4
1975	356.3	331.0
1976	368.3	346.2
1977	365.0	351.9
1978	362.3	357.8
1979	367.6	357.7
1980	340.4	335.1
1981	326.7	322.3
1982	308.0	306.0
1983	291.4	300.1

TABLE 7 ENERGY USE TO GROSS STATE AND NATIONAL PRODUCTS, OHIO AND U.S.
1973 - 1983

(Constant 1972 Dollars)

	OHIO				U.S.			
	GROSS STATE PRODUCT (88)	ENERGY USE (T8tu)	BTU PER DOLLAR GDP	PERCENT CHANGE	GROSS NATIONAL PRODUCT (88)	ENERGY USE (T8tu)	BTU PER DOLLAR GDP	PERCENT CHANGE
1973	984.08	3.935	51.41		91,255	74,809	59.45	
1974	982.72	3.914	52.41	1.6%	91,248	72,759	58.30	-1.9%
1975	959.98	3.837	53.97	2.5%	91,234	70,707	57.30	-1.7%
1976	963.86	3.960	52.21	-2.8%	91,300	74,510	57.32	nil
1977	967.13	3.931	50.56	-5.0%	91,372	76,332	55.64	-2.8%
1978	969.95	3.911	55.91	-4.5%	91,437	78,175	54.40	-2.2%
1979	970.78	3.989	59.07	0.3%	91,489	78,910	53.21	-2.2%
1980	966.97	3.876	54.89	-2.1%	91,491	75,988	51.31	-3.6%
1981	968.86	3.523	52.89	-4.0%	91,510	73,984	49.00	-4.5%
1982	963.92	3.323	51.99	-1.3%	91,485	70,822	47.69	-2.7%
1983	963.62	3.096	48.66	-6.4%	91,535	70,638	46.02	-3.5%

TABLE 8 RATIO OF INDUSTRIAL ENERGY USE TO GROSS PRODUCT DOLLAR

(Thousand Btu)

	1978	1979	1980	1981	1982	1983
OHIO	1.87	1.91	1.77	1.75	1.45	1.43
U.S.	1.73	1.54	1.43	1.31	1.35	1.69

TABLE 9

COAL CONSUMPTION BY END-USE SECTOR
THOUSAND BTU

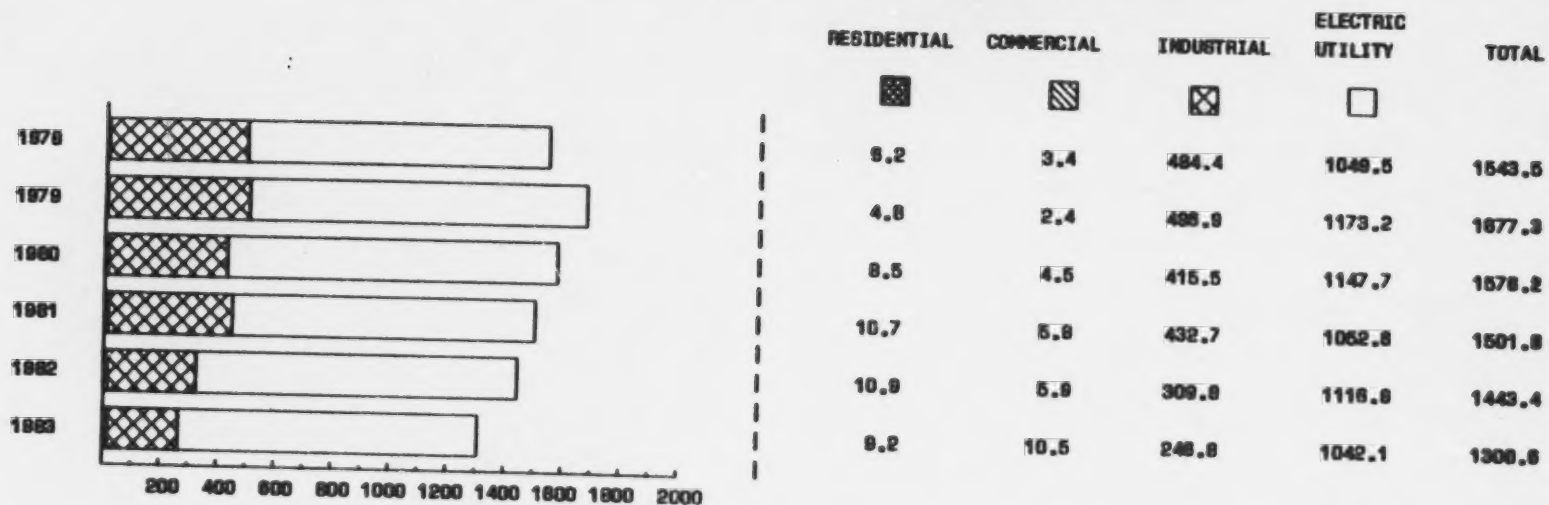
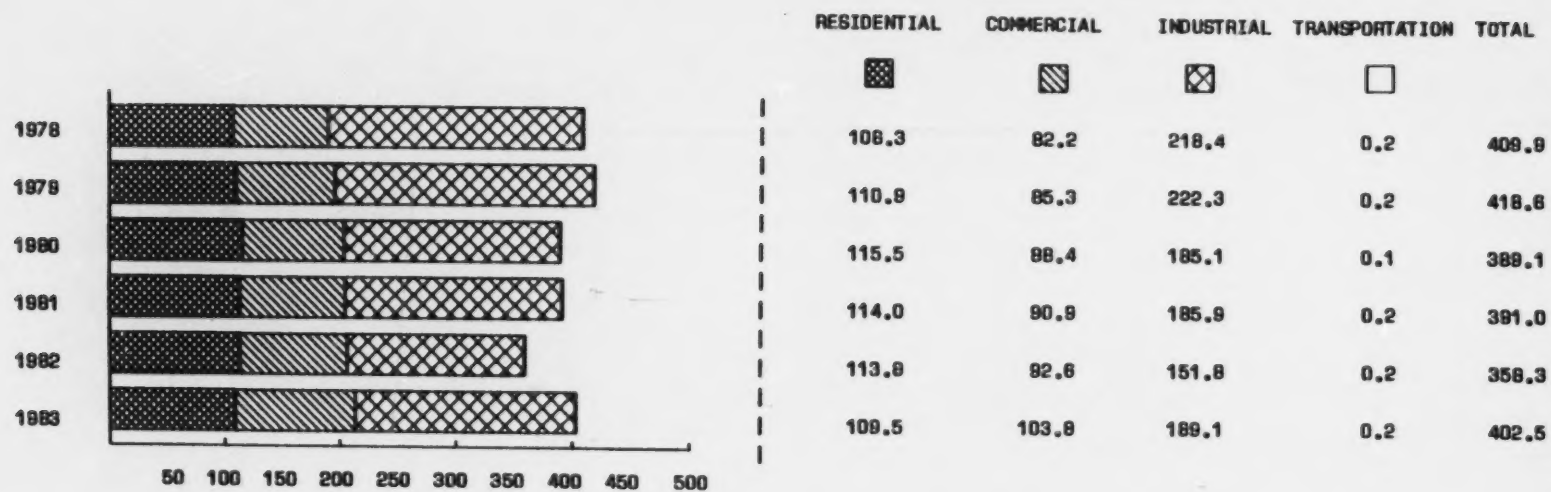


TABLE 10

ELECTRICITY CONSUMPTION BY END-USE SECTOR
THROUGH 1983



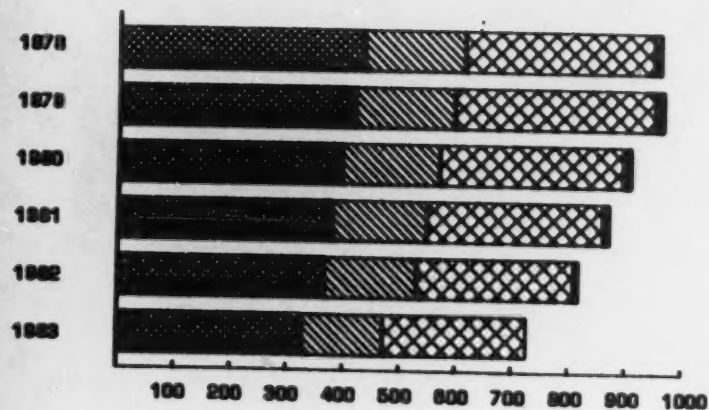


TABLE 11 NATURAL GAS CONSUMPTION BY END-USE SECTOR
THOUSAND BTU

RESIDENTIAL	COMMERCIAL	INDUSTRIAL	TRANSPORTATION	ELECTRIC UTILITY	TOTAL
■	▨	▩	▧	□	
434.8	177.9	334.8	8.2	3.2	958.1
419.0	177.4	354.9	8.7	6.1	966.1
397.8	172.9	324.6	8.3	4.9	908.4
381.7	168.3	311.4	8.3	2.1	871.8
387.9	184.3	276.5	5.8	2.1	856.4
329.2	143.8	253.9	0	0	726.7

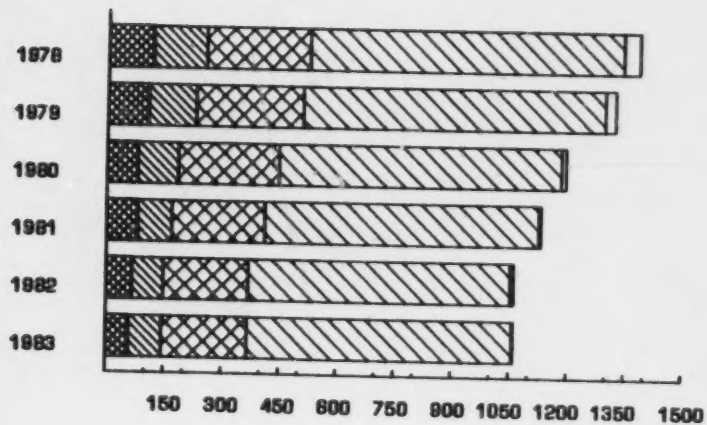


TABLE 12 PETROLEUM CONSUMPTION BY END-USE SECTOR
THOUSAND BTU

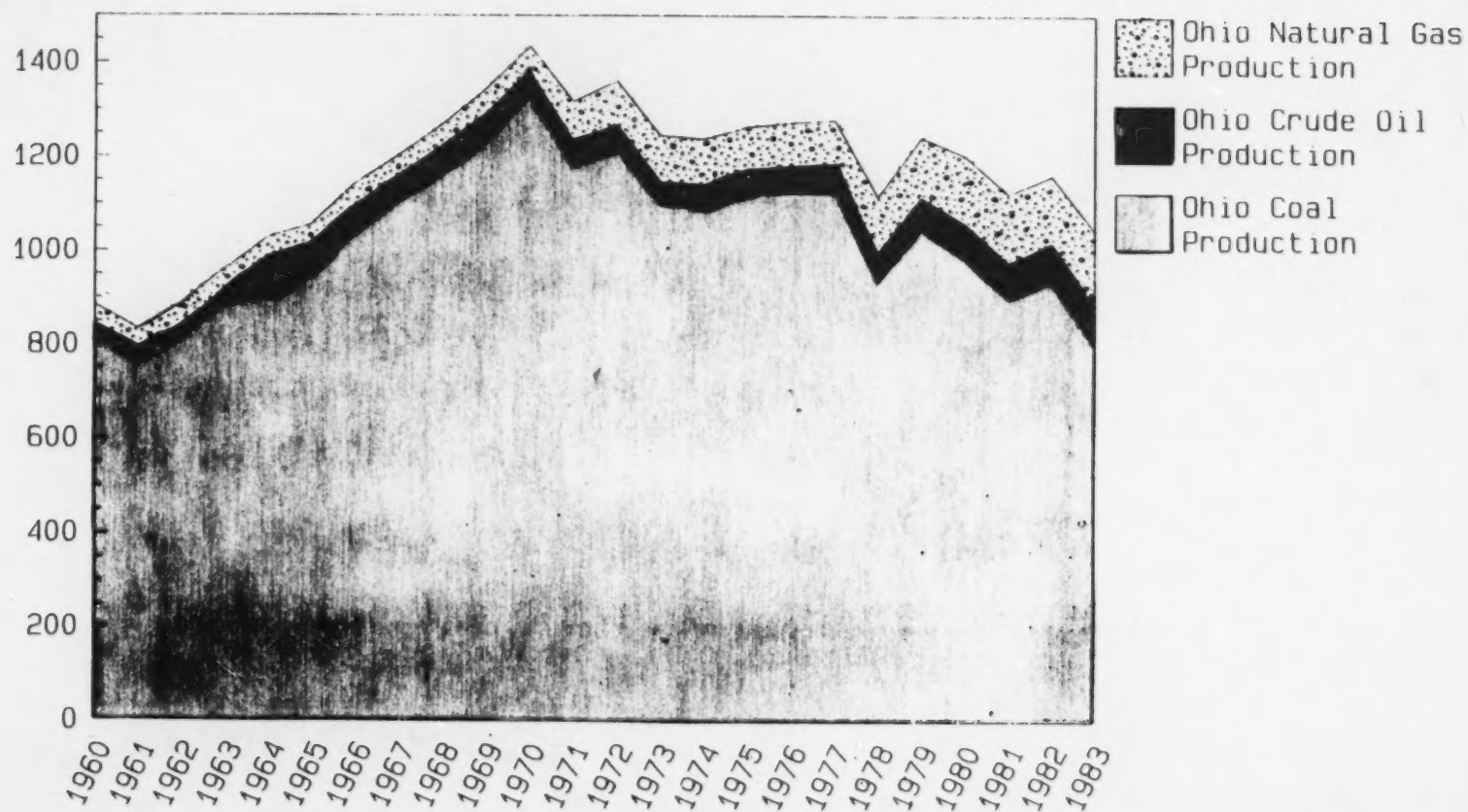
RESIDENTIAL	COMMERCIAL	INDUSTRIAL	TRANSPORTATION	ELECTRIC UTILITY	TOTAL
					
120.0	136.8	288.6	816.9	42.4	1384.7
108.5	123.3	277.7	786.5	26.7	1322.7
81.6	104.9	261.5	735.5	11.5	1195.2
84.2	88.2	241.4	715.2	6.2	1135.2
69.6	81.2	220.3	684.4	8.9	1064.5
62.4	84.8	221.7	690.7	1.7	1061.1

TABLE 13 OHIO ENERGY PRODUCTION AND CONSUMPTION BALANCE SHEET, 1960 - 1983

Year	Coal Production (Short Tons)	Crude Oil Production (000 Bbls)	Natural Gas Production (Mmcf)	Total Ohio Production (Trillion Btu)	Total Ohio Consumption (Trillion Btu)	Percent Ohio Production
1960	33,896,497	5,405	36,074	882.20	2,770.69	31.8%
1961	31,733,741	5,639	36,423	832.01	2,642.50	31.5%
1962	34,010,824	5,835	36,747	888.14	2,761.26	32.2%
1963	36,916,741	6,039	36,817	959.13	2,871.10	33.4%
1964	37,390,478	15,859	37,106	1,027.76	2,883.62	35.6%
1965	39,331,560	12,908	35,684	1,055.76	3,141.02	33.6%
1966	43,068,447	10,899	43,133	1,141.50	3,351.15	34.1%
1967	45,891,615	9,924	41,315	1,201.72	3,408.10	35.3%
1968	48,286,873	11,204	42,673	1,268.03	3,540.25	35.8%
1969	51,193,028	10,972	49,793	1,343.81	3,666.63	36.6%
1970	55,136,699	9,864	52,113	1,434.43	3,805.84	37.7%
1971	49,017,000	9,670	79,903	1,315.19	3,714.74	35.4%
1972	50,572,000	9,358	89,995	1,361.15	3,967.49	34.3%
1973	45,666,000	8,796	93,610	1,243.89	3,935.12	31.6%
1974	45,352,000	9,088	92,055	1,236.44	3,914.66	31.6%
1975	46,667,300	9,578	84,960	1,263.50	3,837.45	32.9%
1976	46,804,000	9,994	88,891	1,273.26	3,917.49	32.5%
1977	46,940,000	10,359	88,327	1,278.06	3,951.36	32.3%
1978	38,840,000	11,154	114,098	1,114.94	3,910.89	28.5%
1979	43,528,000	11,953	123,481	1,241.80	3,994.60	31.1%
1980	40,951,000	12,928	138,856	1,201.52	3,698.90	32.5%
1981	37,342,000	13,551	141,134	1,120.88	3,548.40	31.6%
1982	38,883,000	14,571	138,391	1,160.94	3,323.60	34.9%
1983	33,216,630	14,971	151,300	1,040.63	3,140.90	33.1%

OHIO ENERGY PRODUCTION, 1960 - 1983

Trillion BTU



PURPOSES, PROGRAMS, AND PROJECTS OF THE OHIO COAL DEVELOPMENT OFFICE

PURPOSES

- | | | |
|---|---|--|
| <p>A. Support siting, financing, construction and operation of commercial scale facilities to produce, benefit, market, or use Ohio coal.</p> | <p>C. Assist in coal development facility financing.</p> | <p>E. Improve environmental quality through cleaner use of Ohio coal.</p> |
| <p>B. Support market acceptance of Ohio coal through technology and market development.</p> | <p>D. Encourage use of Ohio coal in State facilities and at Ohio electric utility plants.</p> | <p>F. Assist all public and private sector coal interests in Ohio coal development activities.</p> |

PROGRAMS

PROJECTS

- | | |
|---|---|
| <p>A. Development of commercial scale technologies for clean use of Ohio coal in electric utilities</p> | <ol style="list-style-type: none"> 1. Advanced Energy Dynamics electrostatic cleaning. 2. Coal Gas, Inc. high level sulfur removal. 3. Babcock & Wilcox LIMB demonstration. |
| <p>B. Development of commercial scale technologies for clean use of Ohio coal in industry and State facilities.</p> | <ol style="list-style-type: none"> 1. TRW advanced coal combustor demonstration. 2. Analysis of ability to revive fluidized bed boiler demo at Columbus Hospital. 3. Capital improvements budget coal boiler projects. |
| <p>C. Conversion of Ohio coal to alternative clean fuel forms.</p> | <ol style="list-style-type: none"> 1. Battelle catalytic cleaning via coal gasification. 2. Marketing assistance to coal water slurry projects. |
| <p>D. Enhancement of efficient Ohio production and coal cleaning techniques and technologies.</p> | <ol style="list-style-type: none"> 1. Ohio Automation software for efficient blasting. 2. Lorain Port Authority regional coal blending plan. 3. Accelerated coal washing upgrades/installations. |
| <p>E. Development of historic and new markets for Ohio coal.</p> | <ol style="list-style-type: none"> 1. Ontario Ohio use of Ohio coal for Canada synfuels. 2. Establishment of coal boiler/user database. 3. Computer matching of Ohio coal to user specs. |
| <p>F. Assist in the financing of Ohio coal development projects.</p> | <ol style="list-style-type: none"> 1. Coordination of financing with OAQDA, OMDA. 2. Establish procedures for rate of return recovery. |
| <p>G. Encourage public and private sector joint participation in Ohio coal development projects.</p> | <ol style="list-style-type: none"> 1. Intensified search for nationally sponsored Ohio coal development projects. 2. Joint project planning with private sponsors. |

TABLE 15 OHIO COAL USE BY SOURCE
1970 - 1983

(Thousand Short Tons)

	OHIO COAL USE		COAL IMPORTED FROM OTHER STATES			TOTAL IN-STATE COAL USE
	IN-STATE	EXPORTED	EASTERN	WESTERN	TOTAL	
1970	35,553	19,584	31,822	0	31,822	67,375
1971	33,803	15,414	29,513	0	29,513	63,316
1972	35,130	15,422	32,866	0	32,866	67,996
1973	33,408	12,257	32,348	0	32,348	65,567
1974	33,044	12,308	35,428	1,172	36,599	69,642
1975	33,468	13,205	33,118	1,433	34,551	68,019
1976	35,401	11,403	32,181	3,372	35,553	70,954
1977	36,420	10,700	33,051	4,841	37,892	74,312
1978	30,707	8,133	32,504	4,700	37,204	67,912
1979	32,058	11,619	36,908	3,835	40,743	72,804
1980	20,360	9,823	35,357	2,484	37,841	67,201
1981	28,400	9,139	32,825	2,811	35,636	64,036
1982	27,003	8,580	33,367	1,829	35,196	62,199
1983	28,529	8,332	29,481	382	29,863	58,402

TABLE 16

INVENTORY OF CURRENT OHIO POWER PLANTS

Company	Plant Name	City	State	Units	Fuel	Mode	Summer Capacity	Winter Capacity	Jointly Owned
BUCKEYE POWER	CARDINAL	BRILLIANT	OHIO	2-3	COAL	ST	1215	1230	N
CINCINNATI GAS & ELEC	EAST BEND	BOONE CO	KY	2	COAL	ST	414	414	Y
CINCINNATI GAS & ELEC	MIAMI FORT	NORTH BEND	OHIO	5-8	COAL	ST	883	883	N
CINCINNATI GAS & ELEC	MIAMI FORT	NORTH BEND	OHIO	1-8GT	OIL	GT	152.8	207	N
CINCINNATI GAS & ELEC	WC BECKJORD	NEW RICHMOND	OHIO	1-8	COAL	ST	859.2	861.5	N
CINCINNATI GAS & ELEC	WC BECKJORD	NEW RICHMOND	OHIO	1-4GT	OIL	GT	186.4	244.8	N
CINCINNATI GAS & ELEC	DICKS CREEK	MIDDLE TOWN	OHIO	1-5	OIL	GT	136.2	172.3	N
CINCINNATI GAS & ELEC	JM STUART	ABERDEEN	OHIO	1-4	COAL	ST	912.4	912.4	Y
CINCINNATI GAS & ELEC	CONESVILLE	COSHOCOTON	OHIO	4	COAL	ST	320	288	Y
CINCINNATI GAS & ELEC	KILLEN	WEST UNION	OHIO	2	COAL	ST	198	198	Y
CLEVELAND ELEC ILL	ASHTABULA	ASHTABULA	OHIO	5-8	COAL	ST	427	432	N
CLEVELAND ELEC ILL	AVON LAKE	AVON LAKE	OHIO	8-8	COAL	ST	1045	1051	N
CLEVELAND ELEC ILL	AVON LAKE	AVON LAKE	OHIO	10	OIL	GT	29	35	N
CLEVELAND ELEC ILL	EASTLAKE	EASTLAKE	OHIO	1-5	COAL	ST	1083	1083	N
CLEVELAND ELEC ILL	EASTLAKE	EASTLAKE	OHIO	8	OIL	GT	29	35	N
CLEVELAND ELEC ILL	LAKE SHORE	CLEVELAND	OHIO	14-18	COAL	ST	503	513	N
CLEVELAND ELEC ILL	LAKE SHORE	CLEVELAND	OHIO	0	OIL	ST	4	4	N
CLEVELAND ELEC ILL	SENECA	KINZUA TOWNSHIP	PENN	1-3	HYDR	PUMP	305	305	Y
CLEVELAND ELEC ILL	DAVIS BESSE	CARROLL	OHIO	1	NUCL	ST	447	452	Y
CLEVELAND ELEC ILL	BRUCE MANSFIELD	SHIPPINGPORT	PENN	1-2	COAL	ST	483	470	Y
COLUMBUS & SOUTHERN	PICWAY	COLUMBUS	OHIO	5	COAL	ST	80	100	N

OHIO EDISON	BRUCE MANSFIELD	SHIPPINGPORT	PENN	1-2	COAL	ST	1046	1060	Y
OHIO EDISON	NILES	NILES	OHIO	1-2	COAL	ST	228	230	N
OHIO EDISON	NILES	NILES	OHIO	ACT	OIL	ST	15	30	Y
OHIO EDISON	NEW CASTLE	WEST PITTSBURGH	PENN	1-6	COAL	ST	408	418	N
OHIO EDISON	NEW CASTLE	WEST PITTSBURGH	PENN	A-8	OIL	IC	8	6	Y
OHIO EDISON	WH SAMMIS	STRATTON	OHIO	1-7	COAL	ST	1820	1820	N
OHIO EDISON	WH SAMMIS	STRATTON	OHIO	AEND	OIL	IC	2.8	2.8	Y
OHIO EDISON	WH SAMMIS	STRATTON	OHIO	81-84	OIL	IC	10.4	10.4	Y
OHIO EDISON	TORONTO	TORONTO	OHIO	5-7	COAL	ST	188	172	N
OHIO EDISON	WEST LORAIN	LORAIN	OHIO	ACT-CST	OIL	GT	186	190	Y
OHIO POWER	CARDINAL	BRILLIANT	OHIO	1	COAL	ST	585	600	N
OHIO POWER	GAVIN	CHESHIRE	OHIO	1-2	COAL	ST	2600	2600	N
OHIO POWER	MUSKINGUM RIVER	BEVERLY	OHIO	1-5	COAL	ST	1385	1425	N
OHIO POWER	AMOS	ST. ALBANS	WV	3	COAL	ST	1300	1300	Y
OHIO POWER	KAMMER	CAPTINA	WV	1-3	COAL	ST	600	630	N
OHIO POWER	MITCHELL	CAPTINA	WV	1-2	COAL	ST	1460	1460	N
OHIO POWER	PHILIP SPORN	GRAHAM STATION	WV	1-5	COAL	ST	1020	1050	Y
OHIO POWER	RACINE	RACINE	OHIO	1-2	HYDRO	WT	48	48	N
TOLEDO EDISON	BAYSHORE	OREGON	OHIO	1-4	COAL	ST	621	631	N
TOLEDO EDISON	BAYSHORE	OREGON	OHIO	1CT	OIL	ST	18	17	N
TOLEDO EDISON	ACME	TOLEDO	OHIO	2,5,6,T	COAL	ST	268	268	N
TOLEDO EDISON	ACME	TOLEDO	OHIO	LO PRESS	COAL	ST	20	20	N
TOLEDO EDISON	DAVIS BESSE	OAK HARBOR	OHIO	1	NUCL	ST	423	428	Y
TOLEDO EDISON	RICHLAND	DEFIANCE	OHIO	1-3	OIL	ST	33	42	N
TOLEDO EDISON	STRYKER	STRYKER	OHIO	1	OIL	ST	17	18	N
TOLEDO EDISON	BRUCE MANSFIELD	SHIPPINGPORT	PENN	2-3	COAL	ST	290	294	Y
OHIO VALLEY ELECTRIC	KYGER CREEK	CHESHIRE	OHIO	1-5	COAL	ST	1019	1043	N
OHIO VALLEY ELECTRIC	CLIFTY CREEK	MADISON	IND	1-8	COAL	ST	1215	1257	N

COLUMBUS & SOUTHERN	POSTON	ATHENS	OHIO	1-4	COAL	ST	204	218	N
COLUMBUS & SOUTHERN	CONESVILLE	CONESVILLE	OHIO	1-8	COAL	ST	1454	1478	N
COLUMBUS & SOUTHERN	CONESVILLE	CONESVILLE	OHIO	0	OIL	IC	8	8	N
COLUMBUS & SOUTHERN	WALNUT PEAKING	GROVEPORT	OHIO	0	OIL	GT	158	170	N
COLUMBUS & SOUTHERN	JM STUART	ABERDEEN	OHIO	1-4	COAL	ST	604	608	Y
COLUMBUS & SOUTHERN	JM STUART	ABERDEEN	OHIO	0	OIL	IC	3	3	Y
COLUMBUS & SOUTHERN	MC BECKJORD	RICHMOND	OHIO	8	COAL	ST	52	53	Y
DAYTON POWER & LIGHT	EAST BEND	BOONE CO	KY	2	COAL	ST	186	186	Y
DAYTON POWER & LIGHT	KILLEN	WEST UNION	OHIO	2	COAL	ST	402	402	Y
DAYTON POWER & LIGHT	OH HUTCHINGS	MIAMISBURG	OHIO	1-8	COAL	ST	374	380	N
DAYTON POWER & LIGHT	OH HUTCHINGS	MIAMISBURG	OHIO	7	OIL	GT	28	32	N
DAYTON POWER & LIGHT	YANKEE STREET	CENTERVILLE	OHIO	1-7	OIL	GT	123	144	N
DAYTON POWER & LIGHT	FRANK N TAIT	DAYTON	OHIO	0	OIL	GT	10	10	N
DAYTON POWER & LIGHT	MONUMENT	DAYTON	OHIO	0	OIL	GT	12	12	N
DAYTON POWER & LIGHT	SIDNEY	SIDNEY	OHIO	0	OIL	GT	12	12	N
DAYTON POWER & LIGHT	JM STUART	ABERDEEN	OHIO	1-4	COAL	ST	820	820	Y
DAYTON POWER & LIGHT	MC BECKJORD	NEW RICHMOND	OHIO	8	COAL	ST	207	210	Y
DAYTON POWER & LIGHT	CONESVILLE	CONESVILLE	OHIO	0	COAL	ST	132	132	Y
DAYTON POWER & LIGHT	MIAMI FORT	NORTH BEND	OHIO	7-8	COAL	ST	360	360	Y
OHIO EDISON	RE BURGER	MEAD	OHIO	1-5	COAL	ST	510	518	N
OHIO EDISON	RE BURGER	MEAD	OHIO	ABND	OIL	IC	2	2	Y
OHIO EDISON	RE BURGER	MEAD	OHIO	81-82	OIL	IC	4.8	4.8	Y
OHIO EDISON	BEAVER VALLEY	SHIPPINGPORT	PENN	1	NUCL	ST	810	810	Y
OHIO EDISON	EDGEWATER	LORAIN	OHIO	2-4	COAL	ST	165	168	N
OHIO EDISON	EDGEWATER	LORAIN	OHIO	ACT-BCT	OIL	GT	38	42	Y
OHIO EDISON	GORGE	AKRON	OHIO	8-7	COAL	ST	82	86	N
OHIO EDISON	WAD RIVER	SPRINGFIELD	OHIO	1-3	COAL	ST	48	48	N
OHIO EDISON	WAD RIVER	SPRINGFIELD	OHIO	ACT-BCT	OIL	GT	50	60	Y

Average Mine Price of Coal by Producing State 1979 - 1983

Dollars per Ton

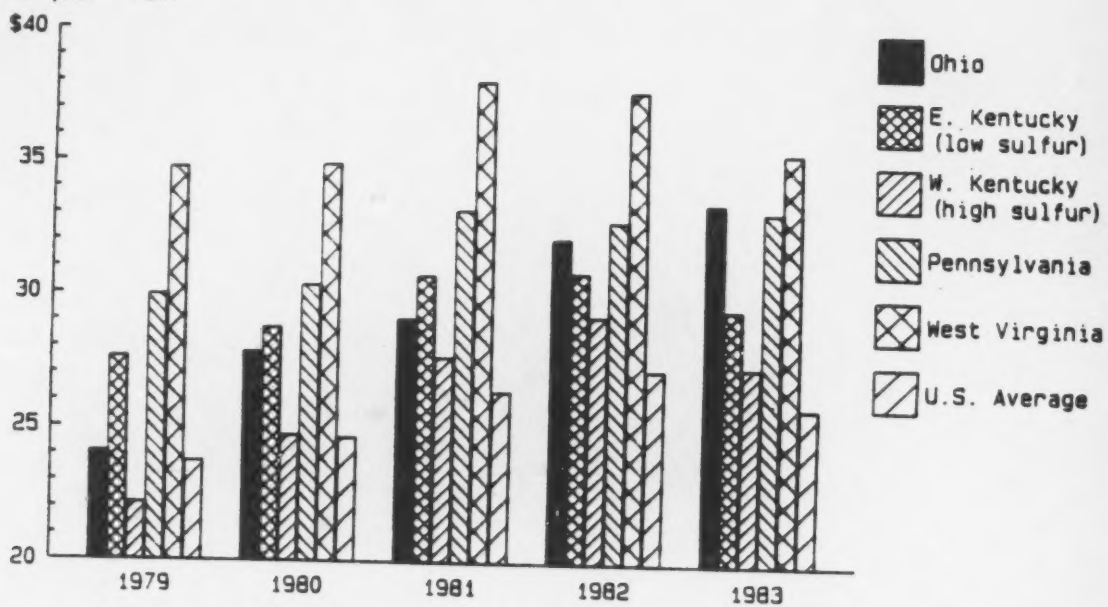


FIGURE 21

TABLE 17 ELECTRICITY CONSUMPTION BY INDUSTRIAL SIC CODE
ANNUAL DATA IN GIGAWATT-HOURS

	TEXTILE	PAPER	PRINT	CHEMICALS	PETRO	RUBBER	STONE	PRIMARY METALS	FABRICATED METALS	MACHINE	ELECTRIC MACHINE	TRANSPORT EQUIPMENT	OTHER	TOTAL
1978	117.8	1437.5	514.7	3486.3	1845.7	2337.1	2505.5	22305.0	2494.7	2439.3	2489.4	4655.2	16110.1	64830.7
1979	94.6	1364.5	492.0	3438.3	1835.7	2052.2	2373.8	19050.1	2264.0	2349.7	2272.4	3972.7	9343.6	53891.7
1980	80.2	1420.7	483.2	3723.1	1754.3	2069.0	2288.5	19325.9	2448.2	2357.4	2514.4	4115.8	9531.7	54318.0
1981	77.9	1254.8	432.0	3443.0	1589.6	1920.3	2057.0	12785.5	2203.3	2098.1	2433.6	3855.7	9413.8	45838.3
1982	106.9	1140.3	404.0	3807.8	1776.2	1968.2	2093.8	14135.9	2376.0	1787.3	1790.6	4371.8	9935.6	47956.5
1983	104.6	1209.8	399.1	3828.1	1874.1	2152.8	2207.3	17629.8	2483.3	1904.5	2072.5	4093.7	13167.0	55422.4

TABLE 18 NATURAL GAS CONSUMPTION BY INDUSTRIAL SIC CODE
ANNUAL DATA IN MILLION BTU

	FOOD	CHEMICAL	PETRO & COAL	RUBBER	STONE	PRIMARY METALS	FABRICATE METALS	MACHINE	ELECTRIC MACHINERY	OTHER	TOTAL
1978	11632	39021	9174	6910	44839	126981	27012	5501	7385	30574	309032
1979	16188	46093	11976	8621	45720	133568	27021	5259	5739	38978	339165
1980	15217	44177	11836	7393	41754	105947	24245	5111	4436	37063	297182
1981	15308	51168	10000	7669	31703	106599	27298	5416	5026	35538	295729
1982	13373	41482	7863	6899	23452	82597	22096	5668	4348	30758	238539
1983	11251	20054	7468	6551	19463	66700	14957	8028	7947	26322	188744

TABLE 19

OHIO ELECTRICITY CUSTOMERS, SALES, AND REVENUES
BY ELECTRIC UTILITY, 1988

COMPANY	CUSTOMERS	RESIDENTIAL		
		REVENUE (\$000)	SALES (MWH)	REVENUE (\$/KWH)
Cincinnati Gas & Electric	457,088	\$291,503	4,585,830	0.0638
Cleveland Electric Illuminating	842,788	\$385,075	4,412,158	0.0873
Columbus & Southern Ohio Electric	428,256	\$248,223	3,890,384	0.0673
Dayton Power & Light	378,432	\$281,888	3,888,534	0.0789
Monongehela Power	21,875	\$8,447	182,847	0.0517
Ohio Edison	783,032	\$478,172	5,858,114	0.0813
Ohio Power	541,088	\$315,481	5,183,588	0.0808
Toledo Edison	242,382	\$181,275	1,914,748	0.0842
TOTAL RESIDENTIAL SECTOR	3,473,012	2,189,122	29,477,001	0.0738
COMPANY	CUSTOMERS	COMMERCIAL		
		REVENUE (\$000)	SALES (MWH)	REVENUE (\$/KWH)
Cincinnati Gas & Electric	47,288	\$198,075	3,058,859	0.0458
Cleveland Electric Illuminating	82,115	\$334,880	4,285,023	0.0445
Columbus & Southern Ohio Electric	41,088	\$202,004	3,403,882	0.1040
Dayton Power & Light	34,898	\$138,038	2,074,808	0.0477
Monongehela Power	2,518	\$5,387	108,808	0.0182
Ohio Edison	78,982	\$348,438	4,508,020	0.0818
Ohio Power	87,401	\$178,447	3,108,885	0.0133
Toledo Edison	23,558	\$105,481	1,340,987	0.0337
TOTAL COMMERCIAL SECTOR	358,588	1,510,508	21,980,870	0.0891
COMPANY	CUSTOMERS	INDUSTRIAL		
		REVENUE (\$000)	SALES (MWH)	REVENUE (\$/KWH)
Cincinnati Gas & Electric	2,470	\$201,118	4,297,387	0.0468
Cleveland Electric Illuminating	7,238	\$430,209	7,513,874	0.0573
Columbus & Southern Ohio Electric	2,775	\$95,658	1,941,998	0.0483
Dayton Power & Light	2,309	\$153,182	2,912,778	0.0528
Monongehela Power	757	\$8,801	285,434	0.0325
Ohio Edison	908	\$359,775	6,758,728	0.0532
Ohio Power	6,838	\$481,335	13,541,128	0.0383
Toledo Edison	1,522	\$189,873	3,127,243	0.0543
TOTAL INDUSTRIAL SECTOR	24,818	1,810,527	40,388,368	0.0473
GRAND TOTAL	3,853,414	5,590,157	91,728,037	0.0808

TABLE 20 OHIO ELECTRIC UTILITY ENVIRONMENTAL AND RESEARCH EXPENDITURES

COMPANY	1988 ENVIRONMENTAL EXPENSES	CUMULATIVE ENVIRONMENTAL EXPENDITURES	RESEARCH AND DEVELOPMENT EXPENSES
Cincinnati Gas and Electric	\$27,481,807	\$275,583,743	\$1,534,831
Cleveland Electric Illuminating	NA	\$523,114,758	\$5,908,291
Columbus & Southern Ohio Electric	NA	NA	NA
Dayton Power & Light	\$14,858,238	\$218,472,035	\$2,184,928
Ohio Edison (System)	\$88,255,584	\$585,882,528	\$2,420,672
Ohio Power	NA	NA	NA
Ohio Valley Electric	\$13,585,290	\$71,788,101	\$73,788
Toledo Edison	\$15,212,531	\$212,428,245	\$298,834
TOTAL	\$138,170,438	\$1,887,080,408	\$12,418,422

TABLE 21 OHIO ELECTRICITY SUPPLY AND GENERATION BY ELECTRIC UTILITY RANKING
1982 - 1983

(Megawatt-hours per Year)

ELECTRIC UTILITY	1983				
	NET ENERGY FOR LOAD	PERCENT OF TOTAL	IN-STATE NET GENERATION	PERCENT OF TOTAL	IN STATE SALES
Ohio Power	28,520,000	22.8%	22,889,000	21.4%	22,813,182
Ohio Edison	20,104,000	15.9%	12,883,004	11.8%	18,212,422
Cleveland Electric Illuminating	18,584,400	14.7%	15,757,500	14.8%	17,308,888
Cincinnati Gas & Electric	13,889,783	10.8%	12,804,817	11.8%	13,135,870
Dayton Power & Light	11,422,041	9.1%	10,313,000	9.7%	10,008,332
Columbus & Southern Ohio Electric	10,288,000	8.1%	11,153,000	10.3%	9,473,554
Toledo Edison	7,833,000	6.2%	6,791,000	6.4%	7,130,548
Ohio Valley Electric	10,528,834	8.3%	8,827,000	8.4%	7,218,253
Buckeye Power	4,582,558	3.6%	7,200,000	6.6%	4,074,388
Monongahela Power	576,132	0.5%	0	0.0%	587,204
TOTAL	128,081,828		105,992,121		108,760,189

ELECTRIC UTILITY	1982				
	NET ENERGY FOR LOAD	PERCENT OF TOTAL	IN-STATE NET GENERATION	PERCENT OF TOTAL	IN STATE SALES
Ohio Power	24,820,288	19.2%	21,789,448	21.1%	21,372,374
Ohio Edison	29,882,208	28.2%	14,752,744	14.3%	17,607,888
Cleveland Electric Illuminating	18,481,887	17.4%	14,418,277	13.8%	18,678,882
Cincinnati Gas & Electric	14,123,044	13.3%	13,848,791	13.2%	12,870,318
Dayton Power & Light	11,032,817	10.4%	10,189,538	9.8%	9,880,117
Columbus & Southern Ohio Electric	10,384,804	9.7%	9,320,523	9.0%	9,083,285
Toledo Edison	7,812,288	7.2%	6,067,810	5.8%	6,818,278
Ohio Valley Electric	7,377,003	6.9%	6,393,715	6.2%	6,872,832
Buckeye Power	4,300,521	4.0%	6,930,921	6.7%	4,113,718
Monongahela Power	812,983	0.6%	0	0.0%	540,347
TOTAL	128,457,838		103,488,587		105,728,028

TABLE 22 COMPARISON OF SELF HELP AND UTILITY INDUSTRIAL SALES VOLUMES, 1974-1983
MILLION CUBIC FEET

Year	Columbia Gas of Ohio Total Self Help Volumes	East Ohio Gas Total Self Help Volumes	Total Self Help Volumes	Columbia Gas of Ohio Total Industrial Sales	East Ohio Gas Total Industrial Sales	Total Industrial Sales	Percent Self Help Gas
1974	82	81	162	186,881	150,048	336,710	0.05%
1975	849	647	1,298	129,587	118,030	247,597	0.52%
1976	788	2,704	3,500	128,450	125,308	253,758	1.36%
1977	5,271	8,345	11,616	100,892	113,440	214,332	5.14%
1978	9,216	6,990	16,206	117,359	130,870	248,229	6.13%
1979	9,597	8,066	17,664	140,511	134,851	275,362	6.03%
1980	8,162	11,508	19,688	128,072	104,894	232,966	7.78%
1981	9,318	15,612	24,931	130,844	101,828	232,672	9.88%
1982	8,178	11,708	19,885	103,545	82,189	185,734	9.87%
1983	23,249	14,002	37,251	68,402	77,899	146,101	20.32%

HISTORIC AND PROJECTED PURCHASES OF OHIO NATURAL GAS BY OHIO DISTRIBUTION COMPANIES, 1981 - 1993

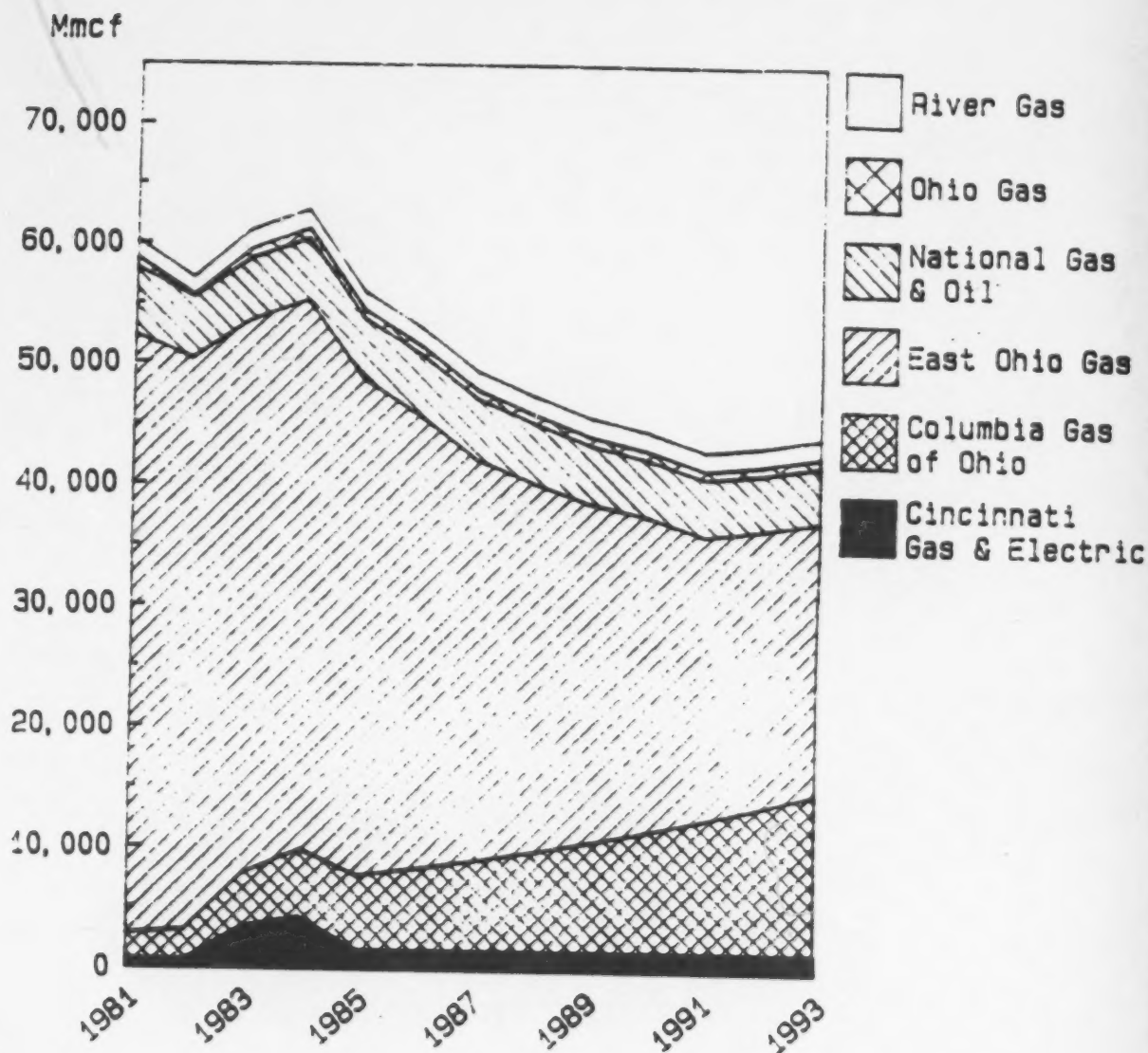


FIGURE 22

TABLE 23

OHIO NATURAL GAS CUSTOMERS, SALES, AND REVENUES
BY NATURAL GAS UTILITY, 1983

RESIDENTIAL				
COMPANY	CUSTOMERS	REVENUE (\$000)	SALES (\$/Mcf)	REVENUE (\$/Mcf)
Cincinnati Gas & Electric	289,544	\$193,830	31,402	6,1726
Columbia Gas of Ohio	981,418	\$759,625	115,033	6,6035
Dayton Power & Light	241,288	\$198,140	28,887	6,1789
East Ohio Gas	928,863	\$748,482	135,253	5,5339
National Gas & Oil	13,330	\$7,782	1,502	5,1811
Ohio Gas	20,374	\$16,288	2,107	7,7216
River Gas	18,861	\$9,465	1,643	5,7608
West Ohio Gas	48,743	\$35,192	5,150	6,8334
TOTAL RESIDENTIAL SECTOR	2,520,619	\$1,836,784	318,987	6,0717
COMMERCIAL				
	CUSTOMERS	REVENUE (\$000)	SALES (\$/Mcf)	REVENUE (\$/Mcf)
Cincinnati Gas & Electric	30,477	\$112,288	19,034	5,8984
Columbia Gas of Ohio	79,278	\$317,785	51,524	6,1677
Dayton Power & Light	17,824	\$45,883	11,088	4,1371
East Ohio Gas	55,912	\$269,432	52,388	5,1430
National Gas & Oil	1,288	\$3,580	725	4,9103
Ohio Gas	2,304	\$8,858	922	7,4383
River Gas	1,484	\$3,615	662	5,4807
West Ohio Gas	158,048	\$17,918	2,836	6,3173
TOTAL COMMERCIAL SECTOR	348,572	\$777,348	139,184	5,5850
INDUSTRIAL				
	CUSTOMERS	REVENUE (\$000)	SALES (\$/Mcf)	REVENUE (\$/Mcf)
Cincinnati Gas & Electric	1,488	\$109,986	19,438	5,6589
Columbia Gas of Ohio	1,804	\$381,938	68,570	5,5700
Dayton Power & Light	1,404	\$57,273	10,559	5,4241
East Ohio Gas	1,371	\$377,571	79,745	4,7347
National Gas & Oil	88	\$30,784	7,428	4,1427
Ohio Gas	233	\$11,808	1,844	6,4023
River Gas	21	\$6,882	1,310	5,2534
West Ohio Gas	4,702	\$14,932	2,464	6,0801
TOTAL INDUSTRIAL SECTOR	10,899	\$991,154	191,354	5,1797
GRAND TOTAL	2,878,090	3,705,287	649,525	5,7048

TABLE 24

PETROLEUM PRODUCT CONSUMPTION BY END-USE SECTOR
1982

	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	TRANSPORT	ELEC UTIL	TOTAL
ASPHALT & ROAD OIL						
MILLION BARRELS		9.24				9.24
TRILLION BTU		58.38				58.38
DIESEL			3.90	15.70		19.60
MILLION BARRELS			22.50	81.88		114.19
TRILLION BTU						
DISTILLATE						
MILLION BARRELS	7.38	3.47	5.58	3.77	0.28	20.44
TRILLION BTU	42.89	20.20	32.80	21.85	1.51	119.25
FEEDSTOCK						
MILLION BARRELS			23.01			23.01
TRILLION BTU			117.81			140.92
PETRO COKE						
MILLION BARRELS			3.18			3.18
TRILLION BTU			17.80			17.80
GASOLINE						
MILLION BARRELS		0.90	0.58	92.40		93.88
TRILLION BTU		5.50	3.90	544.20		553.59
KEROSENE						
MILLION BARRELS	1.89		0.28			2.15
TRILLION BTU	10.74		1.45			12.18
JET FUEL						
MILLION BARRELS				5.90		5.90
TRILLION BTU				32.60		38.50
LPG						
MILLION BARRELS	2.17	0.38	3.44	0.07		6.06
TRILLION BTU	8.70	1.54	13.79	0.27		24.30
RESIDUAL						
MILLION BARRELS		0.18	1.80	.00	0.03	2.09
TRILLION BTU		1.00	11.83	0.02	0.19	15.23
TOTAL						
MILLION BARRELS	11.43	14.15	80.41	193.83	0.29	280.10

TABLE 25 OHIO RETAIL GASOLINE MARKET SHARES
1982 - 1983

1983			1982		
COMPANY	GALLONS (000)	MARKET SHARE	COMPANY	GALLONS (000)	MARKET SHARE
Sohio	1,229,538	23.5%	Sohio	1,246,188	24.0%
Marathon	720,31	14.0%	Marathon	854,882	12.6%
Shell	266,267	5.4%	Shell	260,788	5.0%
Ashland	237,320	4.5%	Ashland	230,596	4.4%
Clark	209,580	4.0%	Sun	209,422	4.0%
Sun	188,244	3.6%	Clark	184,332	3.6%
Certified	102,891	2.0%	Gulf	119,886	2.3%
Gulf	96,270	1.8%	Certified	109,996	2.1%
Porta	96,157	1.8%	Lyden	74,833	1.4%
Lyden	76,143	1.5%	Porta	71,841	1.4%
Union	75,733	1.5%	Union	71,760	1.4%
Omega	66,854	1.3%	Exxon	67,372	1.3%
Mobil	54,342	1.0%	Omega	65,062	1.3%
Englefield	53,893	1.0%	Mobil	51,768	1.0%
Campbell	44,081	0.8%	Englefield	50,402	1.0%
Hi-Lo	39,347	0.7%	Keyo	47,750	0.8%
Rich	38,634	0.7%	Hi-Lo	41,510	0.8%
Keyo	37,318	0.7%	Oasis	41,301	0.8%
Holland	34,285	0.7%	Rich	34,430	0.7%
King Kwik	30,466	0.6%	Campbell	34,334	0.7%
TOTAL	3,739,497	70.7%	TOTAL	3,668,007	70.7%
TOTAL MARKET	5.3 BILLION GALLONS		TOTAL MARKET	5.2 BILLION GALLONS	

TABLE 26 GASOLINE PRICES FOR SELECTED CITIES IN OHIO AND U.S. URBAN AVERAGE
1973 - 1983

DOLLARS PER GALLON

	LEADED REGULAR			UNLEADED REGULAR		
	CINCINNATI	CLEVELAND	U.S. URBAN AVERAGE	CINCINNATI	CLEVELAND	U.S. URBAN AVERAGE
1973	\$0.45	\$0.42	\$0.42			
1974	\$0.54	\$0.53	\$0.49			
1975	\$0.58	\$0.59	\$0.57			
1976	\$0.59	\$0.61	\$0.59	\$0.61	\$0.61	\$0.61
1977	\$0.61	\$0.65	\$0.62	\$0.65	\$0.64	\$0.66
1978	\$0.65	\$0.68	\$0.63	\$0.69	\$0.69	\$0.68
1979	\$0.66	\$1.18	\$0.68	\$0.90	\$0.91	\$0.92
1980	\$1.17	\$1.30	\$1.20	\$1.23	\$1.23	\$1.26
1981	\$1.27	\$1.23	\$1.31	\$1.35	\$1.39	\$1.38
1982	\$1.22	\$1.27	\$1.22	\$1.29	\$1.33	\$1.30
1983	\$1.19	\$1.16	\$1.16	\$1.25	\$1.25	\$1.24

Notes & Sources

1. Total energy consumed: includes coal, natural gas, self help gas, special purchase gas and fuel oil displacement gas, refined petroleum products supplied, electric utility and industrial and municipal generation from hydropower, nuclear power, wood and waste, along with net imports of electricity. Historic data which have not been available, such as solar energy, geothermal, and biomass are not included in total consumption figures.

2. Coal is anthracite, bituminous and lignite

Ohio coal characteristics:

- High Btu bituminous
- 50 percent fixed carbon
- 11,500-12,500 Btu per pound
- Price of coal \$34/ton
- 76 percent of all coal produced in Ohio was consumed in Ohio

Sources:

- Ohio Department of Natural Resources, Division of Geological Survey.
- Electric utilities - Energy Information Administration (EIA), EIA Form 759 (formerly FPC Form 4), "Monthly Power Plant Report".
- EIA Form 6, "Coal Distribution Report".
- Federal Energy Regulatory Commission (FERC) Form 423.
- Energy Information Administration, "Cost and Quality of Fuels for Electric Plants".
- 1983 Keystone Coal Industry Manual, published by Mining Information Services, 1983 New York.

3. Conversion Factors & Measures

Units of measures:

TBtu	trillions of British Thermal Units
MMBtu	millions of British Thermal Units
BCF	billions of cubic feet
MCF	thousands of cubic feet
GWh	millions of kilowatt-hours, (gigawatt hours)
TH BBL	thousands of 42 gallon barrels

Conversion factors:

Coal	23.2 (million Btu per ton)
Electricity	3.412 (thousand Btu per KWh)
Gasoline	5.25 (million Btu per barrel)
Hydro	10.39 (thousand Btu per kwh)
Natural Gas	1.032 (thousand Btu per cubic foot)
Nuclear	10.49 (thousand Btu per KWh)

4. Electricity

Sources:

- Ohio Division of Energy monthly Form SE-1.
- Individual Utility "Long Term Forecast Reports" filed annual with ODOE, Forms FE-1,4,7, and 8.
- EIA Form 4 "Generation and Consumption of Fuels".
- FERC Form 423 "Cost and Quality of Fuels for Electric Plants".
- FERC Form 1 "Annual Report of Electric Utilities, Licenses and Others" (Class A and B).

5. Natural gas consumption includes standard tariff utility sales, self help natural gas, Fuel Oil Displacement (FOD) Gas, Synthetic Natural Gas (SNG), and Special Marketing Programs (SMP) gas. It does not include direct purchase of gas by industrial concerns from an interstate wholesale supplier. Consequently consumption values do not accurately represent demand.

- Ohio produced gas in 1983 was 62.8 BCF, 8.6 percent of total supply.
- The weighted average state aggregate price is slightly less than \$4.48 per thousand cubic feet.
- Aggregate demand for utility supplied natural gas was 700 billion cubic feet (BCF).
- Self help and FOD gas consumption was slightly more than 54 BCF.
- Natural gas consumption declined 17 percent from 1982 to 1983.
- Aggregate demand is down approximately 30 percent from 1979 level.

Sources:

- Ohio Division of Energy monthly SG-1 and SG-2 Forms.
- Ohio utility "Long Term Forecast Report" Forms FG-1, FG-2, FG-4, and FG-4a.

6. Petroleum consumption is derived from various sources. A complete methodology is available in the working notes for the Status Report, filed in the Division of Energy Library. Each petroleum product is calculated separately.